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United States  
Department of  
Agriculture

Forest Service

Tongass  
National  
Forest  
R10-MB-354

December 1997



# Crane and Rowan Mountain Timber Sales

## Draft Environmental Impact Statement

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United States  
Department  
of Agriculture

Forest  
Service

Region 10  
Tongass National Forest

Stikine Area  
P.O. Box 309  
Petersburg, Alaska 99833  
(907-772-3841)

File Code: 1950

Date: December 31, 1997

Dear Reviewer:

Here is a copy of the Draft Environmental Impact Statement (EIS) for the Crane-Rowan Mountain Timber Sale in the Stikine Area of the Tongass National Forest. This document describes one no-action alternative and four action alternatives ranging from 17 to 24 million board feet of timber harvest. The preferred alternative is alternative 4, which includes 24 million board feet of timber, to be harvested from 297 acres in 17 units. Harvest method is clearcuts with retention of legacy trees and a diameter limit prescription that in combination are designed to maintain natural disturbance processes. Road construction would include 8 miles of specified and temporary road.

The comment period on the Draft EIS will be 45 days from the date on which notice of availability of the Draft EIS is published in the Federal Register, anticipated to be January 30, 1998. The deadline for comments is anticipated to be March 16, 1998. The Final EIS is expected to be completed in spring 1998.

Federal court decisions have established that reviewers of a Draft EIS must structure their participation so that it is meaningful and alerts an agency to the reviewer's position and contentions. Environmental objections that could have been raised at the Draft stage may be waived if not raised until after completion of the Final EIS. This is so substantive comments and objections are made available to the Forest Service at a time when it can meaningfully consider them and respond to them in the Final EIS.

Comments we receive, including names and addresses of those who comment, will be part of the public record and available for public inspection. If you comment anonymously, we'll consider your comments but you won't have standing to appeal my decision. We can honor a request to withhold your name and address only if you meet the very narrow requirements under the Freedom of Information Act (such as to protect trade secrets). If you have questions or want to comment confidentially, please contact Merrily Jones at (907) 772-3841.

I am the official responsible for this project. As a result, I will be deciding whether or not timber harvest will occur in the Crane Rowan Mountain study area at this time. Furthermore, if timber harvest does occur, I will be deciding where and how it occurs, where road and log transfer facilities are developed, and what mitigation measures are required.

Please send written comments to Everett Kissinger, Team Leader, USDA Forest Service, P.O. Box 1328, Petersburg, AK 99833, or call (907) 772-3841 for additional information or if you would like additional copies of the Draft EIS.

Sincerely,

PATRICIA A. GRANTHAM  
Acting Forest Supervisor



# **Crane and Rowan Mountain Timber Sales**

## **Draft Environmental Impact Statement**

**Tongass National Forest – Stikine Area  
USDA Forest Service  
Alaska Region**

<b>Lead Agency</b>	<b>Tongass National Forest, Stikine Area P.O. Box 309 Petersburg, Alaska 99833</b>
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<b>Responsible Official</b>	<b>Patricia A. Grantham, Acting Forest Supervisor Tongass National Forest, Stikine Area</b>
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<b>For Further Information Contact:</b>	<b>Everett Kissinger Tongass National Forest, Stikine Area P.O. Box 309 Petersburg, Alaska 99833 (907)772-3841</b>
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<b>Abstract:</b>	<b>The Stikine Area of the Tongass National Forest proposes to make approximately 23 million net board feet (MMBF) available for harvest within the Crane and Rowan Mountain Project Area using alternative silvicultural prescriptions. This project would include necessary road construction for the transport of timber. The existing log transfer facility at Rowan Bay would be used for log barging.</b>
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# Summary





# Summary

## Introduction

Alaska Wilderness Recreation and Tourism Association (AWRTA), et.al. vs. Morrison, et.al. resulted in a settlement agreement that “maintained an injunction pending compliance with NEPA and ANILCA Section 810” for certain units approved in the North and East Kuiu Final Environmental Statement (FEIS) Record of Decision (ROD).

The unroaded east Kuiu portion, which was the basis of a subsistence finding of “a significant possibility of a significant restriction” was separated from the already developed north Kuiu area (N&E Kuiu FEIS, 1993).

This Environmental Impact Statement (EIS) documents our efforts to comply with the AWRTA settlement agreement and make decisions about possible timber sales within the Crane and Rowan Mountain project area on north Kuiu Island. These decisions will be based upon laws and other direction and upon public needs and concerns.

In this EIS we describe a Proposed Action and three other alternative approaches to harvesting timber and building and maintaining roads to make timber on Kuiu Island available for harvest within the project area. The No Action Alternative is presented and the agency’s Preferred Alternative is identified. We have also disclosed the environmental effects and resource outputs expected from the Proposed Action and each of the alternatives.

We developed alternatives to address concerns from the public and from the Forest Plan. The key issues addressed are Habitat Conservation, Watershed Effects, Timber Economics and Scenery. A management strategy to maintain natural forest disturbance patterns is used to address several of the issues.

The Record of Decision (ROD) for the 1997 Forest Plan includes instructions for transitioning from the old plan to the revised Forest Plan. Timber sale projects which were initiated under the direction of the 1979 Forest Plan, and which will be completed within the next few years, may be affected to varying degrees by the revised Forest Plan. The ROD describes for categories of timber sale projects, and their relationship to the 1997 Forest Plan. The Crane and Rowan Mountain Timber Sales project is identified under Category 3: “Timber sale projects now being planned, but for which a NEPA decision document will not be signed before the effective date of this Plan” (TLMP ROD, 1997, p. 41).

The ROD directs that Category 3 projects need to be consistent with applicable management direction in the Forest Plan except for new standards and guidelines for wildlife addressing landscape connectivity, endemic terrestrial mammals, northern goshawk, and marten management. Discussions of direct, indirect and cumulative effects for these wildlife resources have been included in Chapter 3 of this DEIS.

The Crane and Rowan Mountain DEIS is ‘tiered’ to the Forest Plan, and also to the Alaska Regional Guide EIS (USDA Forest Service, 1983). General discussions from these documents and the administrative planning record are incorporated by reference rather than repeated in this EIS (40 CFR 1502.21). (See Literature Cited in Chapter 7.)

## Transition to the New Forest Plan

### Purpose and Need

The Crane and Rowan Mountain Timber Sales project is proposed at this time to respond to the goals and objectives identified by the Forest Plan and to move the project area towards the desired future condition. The Forest Plan identified the following goals and objectives:

- To maintain and promote industrial wood production from suitable timber lands, providing a continuous supply of wood to meet society's needs.
- To manage these lands for sustained long-term timber yields.
- To seek to provide a supply of timber from the Tongass National Forest which meets the annual and planning-cycle market demand, consistent with the standards and guidelines of this Land Use Designation.

The Crane and Rowan Mountain Timber Sales project will respond to these goals and objectives by using an ecosystem management approach to moving the project area toward the desired future condition. We will accomplish this by incorporating the principles of disturbance ecology. We will manage suitable timber lands for the production of sawtimber and other wood products while maintaining the natural disturbance patterns found within the project area that provide a range of wildlife habitat. More detailed information on timber market demand, local employment opportunities and timber harvest scheduling can be found in Appendix A (TLMP, 1997).

### Proposed Action

At the start of our project planning process we defined a "proposed action" so that the public and other agencies can know more about the project. The "proposed action" identified at the start of a project does not necessarily end up being the "preferred" or final "selected" alternative.

The Proposed Action (Alternative 2) is to harvest approximately 23 MMBF of timber from 738 acres. About 6.6 miles of specified road and 2.4 miles of temporary road would be constructed. The existing Rowan Bay log transfer facility (LTF) would be used for transport of logs by barge.

### Background

For this project, we chose to put forth as the proposed action the units as they were shown in the North and East (N&E) Kuiu EIS with the new Forest Plan Standards and Guidelines applied. The timber harvest units were originally part of the N&E Kuiu Record of Decision (1993) which made timber available to the Alaska Pulp Corporation under the now terminated APC long term timber sale contract. Efforts to sell portions of the N&E Kuiu units under the Stikine Area's independent timber sale program were legally challenged (*AWRTA v. Morrison*) resulting in a Settlement Agreement, which required further NEPA consideration. The Stikine Area then decided to separate the unroaded east Kuiu area from the already developed north Kuiu area and begin the NEPA process for the two timber sales being considered here.

The Crane and Rowan Mountain Timber Sales NEPA process began as two separate Environmental Analyses (EAs). In response to public input, we decided to document the analysis of these two proposed timber sales in this EIS.

### Decision to be Made

The Crane and Rowan Mountain Timber Sales EIS, as a project-level analysis, does not address decisions made at higher levels such as the Forest Plan. It does implement direction provided at those higher levels.

The Stikine Area Forest Supervisor is the deciding official and will decide:

- If, where and how much harvest will occur in the Crane and Rowan Mountain project area,
- The locations and design of road construction,
- Whether there may be a significant restriction on subsistence uses,
- What mitigation measures and monitoring will be implemented, and
- The extent to which the project will mimic natural disturbance processes and maintain the natural disturbance patterns existing in the project area.

## Public Involvement

### Scoping

**“Public Scoping”** is the term used to describe the process of finding the key issues for a project by contacting interested individuals and agencies to determine their concerns. The north Kuiu project area has been the subject of many planning efforts since the 1970’s. Scoping results from those projects has been used along with the following list of letters, contacts and meetings that took place during the planning of this project.

Spring, Summer and Fall, 1997– Stikine Area Project Schedule lists this project

April, 1997 – Initial scoping letter and newspaper announcements

August, 1997 – Public Scoping Update after decision to do an EIS

August 1997 – Notice of Intent is published in the Federal Register

November, 1997 – Public Open House in Petersburg and Kake

Various meetings, field trips, and written correspondence with individuals, agencies, and organizations including: Alaska Dept. of Fish and Game, National Marine Fisheries Service, U.S. Fish and Wildlife Service, Alaska Department of Environmental Conservation, the Office of General Counsel.

## Key Issues

Based on the responses to public scoping and on internal concerns, we refined the list of preliminary issues from the scoping letters and the Notice of Intent into key issues. These issues are within the scope of project analysis and are used to create different action alternatives.

### Habitat Conservation

**Issue** – The degree to which each alternative affects wildlife habitat. We will focus on habitat for deer and marten.

**Comments** – Many individuals and agencies expressed concern about fragmentation and connectivity for wildlife species and their habitat requirements. Concerns were expressed regarding the goshawk, wolf, and peregrine falcon. Also of concern are the potential impacts to deer populations and their contribution to subsistence use.

**Measurement** – We will use wildlife habitat capability models to compare the changes in habitat between the alternatives. We will also measure the number of acres of different prescriptions and discuss the impacts to important wildlife habitat.

We will mimic the natural disturbance processes across the landscape as a way to address forest fragmentation and connectivity. We’ll measure this by comparing the forest mosaic in



## Summary

terms of habitat suitability at several different time periods and landscape levels. We will describe how each action alternative will contribute to the desired future condition.

### Watershed Effects

**Issue** – The degree to which watersheds are at risk for undesirable flow response and reduction in water quality.

**Comments** – The public comment included concerns about cumulative watershed effects.

**Measurement** – We calculate the proposed and cumulative road miles and harvest acres in affected watersheds.

### Timber Economics

**Issue** – The degree to which each alternative provides an economic timber sale.

**Comments** – There was concern about the rising costs associated with logging especially where conventional yarding methods are replaced by helicopter yarding. The miles of existing and proposed roads were also concerns for harvest economics.

**Measurement** – We will estimate the volume to be harvested in each alternative and show the relative costs and benefits at an average market of using different yarding systems. We will also show the miles of road to be constructed and display how this affects economics.

### Scenery

**Issue** – The degree to which each alternative will affect the landscape character of the Crane Rowan Mountain project area, and to what extent harvest units are designed to maintain scenic quality as outlined in the Forest Plan.

**Comments** – Comments were received addressing the potential impacts of timber harvesting on the scenic quality, particularly as seen from Chatham Strait and other saltwater viewing locations. Other concerns expressed maintaining a pristine condition for all of Kuiu Island. Individuals specifically mentioned scenic considerations along the face of Rowan Mountain.

**Measurement** – We will describe the Visual Quality Objective (VQO) achieved in each alternative and compare it to those adopted in the Forest Plan. We will measure the cumulative level of visual disturbance in each VCU and compare the alternatives.

## Other Environmental Considerations

Other resource issues are important, but were not used to drive alternative development. The main effects on recreation are related to the scenery issue and will be covered in that section. The other recreation effects will be minimal and similar regardless of the alternative picked. Other resources are protected to such a degree by the Standards and Guidelines in the Forest Plan and by other laws and constraints that the effects from each of the alternatives are not significant and are essentially the same. A more detailed discussion of these important resources and the protection measures used for them is in the Other Environmental Considerations section in Chapter 3 starting on page 3-51.

## Issues Outside the Scope of this Analysis

These are issues raised by the public that are beyond the scope of this document. We received comments from people who wanted no more timber harvest on Kuiu Island and from people who wanted more of Kuiu Island to be made available for timber harvest. The difficult task of allocating land to different uses was done in the Forest Plan (TLMP, 1997). The Plan looks at multiple use for the Tongass as a whole and determines what areas are best used in what ways. These land allocation issues are outside the scope of this project level analysis.

## Alternatives Considered in Detail

### Alternative 1 (No Action)

With this alternative we analyze the effects of having no timber sale or road construction in the Crane and Rowan Mountain project area. This alternative is provided so that you can see the changes that the other alternatives have on the social, physical, and biological environment. This alternative is the most responsive to maintaining current wildlife habitat, scenery and watershed condition by deferring harvest. It would not contribute to local employment or income and would not move the project area toward the desired future condition that is stated in the Forest Plan (TLMP, 1997). Table 2-1 and Figure 2-10 display the no action alternative.

### Alternative 2 (Proposed Action)

The proposed action would harvest approximately 23 MMBF of timber from about 738 acres. It would offer the second most volume to potential large and small operators and provides the best economic return of all of the alternatives. Table 2-1 and Figure 2-11 display the specific activities. All of this harvest would be clearcut<sup>1</sup> and would use cable or helicopter yarding. Approximately 6.59 miles of specified road and 2.42 miles of temporary road would be constructed to access some of this timber and provide infrastructure for future sales. This and all other action alternatives will use the existing Rowan Bay LTF for log barging. This alternative serves as the basis of comparison for the other alternatives.

### Alternative 3

Alternative 3 responds primarily to public concerns surrounding wildlife habitat, scenery and watershed resources. Harvesting some units as partial cuts rather than clearcuts would reduce fragmentation and watershed and visual impacts. This alternative would harvest approximately 17.8 MMBF of timber from about 738 acres. This includes 193 acres of clearcuts and 545 acres of partial harvest. Approximately 6.59 miles of specified road and 2.42 miles of temporary road would be constructed to access some of this timber and provide infrastructure for future sales. This and all other action alternatives will use the existing Rowan Bay LTF for log barging. Table 2-1 and Figure 2-12 display the specific activities involved in Alternative 3.

### Alternative 4 (Preferred Action)

Alternative 4 responds to the timber economics, wildlife habitat and fragmentation, scenery and watershed issues. Alternative 4 comprises all of the units in Alternative 2 except for two. One clearcut unit in the Security Creek watershed was dropped to lower the risk to watershed resources. On Rowan Mountain, one clearcut unit was dropped and other partial harvest units enlarged or added to better maintain natural disturbance patterns. This alternative would harvest approximately 24 MMBF of timber from about 1056 acres. This includes 160 acres of clearcut and 896 acres of partial harvest. Approximately 6.59 miles of specified road and 1.4 miles of temporary road would be constructed to access some of this timber and provide infrastructure for future sales. This and all other action alternatives will use the existing Rowan Bay LTF for log barging. Table 2-1 and Figure 2-13 display the specific activities involved in Alternative 4.

### Alternative 5

Alternative 5 responds primarily to public concerns surrounding watershed resources and timber economics. This alternative drops all harvest from the Security Creek watershed in order to lower the risk to the watershed resource. Dropping these units would also decrease impacts on fragmentation and the visual resource in this watershed. This alternative then uses all of the other clearcut units from Alternative 2 and adds units 402-50 and 402-51 on Rowan Mountain. This alternative would harvest approximately 21 MMBF of timber from about 711 acres. This includes 546 acres of clearcut and 163 acres of partial harvest. Approximately 6.59 miles of specified road and 1.49 miles of temporary road would be constructed to access some of this timber and provide infrastructure for future sales. This and all other action

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<sup>1</sup> Clearcutting is an even aged silvicultural system used to manage forest stands. All clearcut systems planned in this project will include retention of wildlife legacies.

alternatives will use the existing Rowan Bay LTF for log barging. Table 2-1 and Figure 2-14 display the specific activities involved in Alternative 5.

## Alternative Comparison

**Tables 1.** Summary Comparison of Alternatives

Issue	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
<b>Wildlife Habitat</b>					
Deer Habitat Capability Year 2030	81%	80%	80%	80%	80%
POG <sup>2</sup> Harvested – Project Area	0	0.64%	0.41%	0.52%	0.54%
<b>Scenery</b>					
VQO Achieved	R	PR/MM	PR/M	R/PR	PR/MM
Forest Plan VQO	M/MM	M/MM	M/MM	M/MM	M/MM
<b>Timber Economics</b>					
Harvest Volume (MMBF)	0	23.0	17.8	24.0	21.0
Specified Road (miles)	0	6.59	6.59	6.59	6.59
Temporary Road (miles)	0	2.42	2.42	1.40	1.49
Net Stumpage Value	0	\$48.88	\$5.72	\$19.52	\$34.45
Indicated Advertised Rates	0	\$93.09	\$64.64	\$63.35	\$84.23
<b>Watershed Effects</b>					
Dean Creek Second Growth (% of watershed)	31.2	32.2	31.2	31.2	32.2
Dean Creek Open Road Density (Miles/Sq.Mi.)	0.91	0.91	0.91	0.91	0.91
Security Cr. Second Growth (% of watershed)	23.0	25.8	23.0	23.0	23.0
Security Cr. Open Road Density	0.98	0.98	0.98	0.98	0.98

<sup>2</sup> POG is Productive Old Growth



Issue	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
(Miles/Sq.Mi.)					

## Alternatives Dropped From Further Review

We considered including the original selected alternative from the N&E Kuiu EIS as an alternative in this EIS. This alternative was dropped, however, because it doesn't meet the Standards and Guidelines found in the Forest Plan.

## Mitigation Measures

The Forest Service uses a variety of mitigation measures in the design and implementation of timber sales to avoid or reduce impacts to the environment. Law requires some of these mitigation measures; for example, streamside buffers. Some are included as direction from the Forest Plan. Others are very specific to a particular location or unit. These actions and their site-specific application are documented on the unit and road cards in Appendix B. Described below are the mitigation measures we will use for this project under all action alternatives.

### Cultural Resources

Based on inventory work in the Crane and Rowan Mountain project area and elsewhere in southeast Alaska, we developed a model to help us locate those areas where cultural resources are most likely to be found. This model helps identify areas where we will intensively survey for cultural sites prior to any ground-disturbing activity. If additional cultural resources are located, appropriate mitigation and protection will be designed in consultation with the Alaska State Historic Preservation Officer.

### Best Management Practices

Best Management Practices (BMPs) are operating procedures designed to protect water quality. The development of BMPs is mandated by the Clean Water Act. The BMPs for the Tongass National Forest are the result of extensive efforts between the Forest Service and the State of Alaska to identify practices that will ensure that timber harvest activities minimize soil erosion and protect aquatic habitat. The unit and road cards in Appendix B describe site-specific application of BMPs.

### Stream-side Buffers

The Tongass Timber Reform Act mandates a minimum 100-foot wide, no-harvest buffer on both sides of all Class I streams and on those Class II streams that flow directly into Class I streams. The Forest Plan Riparian Standards and Guidelines provide further direction for protection of riparian management areas. Many streamside buffers are wider than the 100 foot TTRA buffer. Specific information about streamside buffers is located on the unit cards in Appendix B.

### Marbled Murrelets

Marbled murrelets are common in the waters around the analysis area. No known nests have been located. If a nest sited is located, a 30-acre buffer surrounding the nest will be provided. Roads can enter this buffer if unavoidable, but every effort will be made to protect the nest site.

### Goshawks

The goshawk is not presently classified as Threatened and Endangered but it is recognized as a Regional Sensitive Species. Two goshawk nests are known to exist in the project area. A 100-acre buffer has been placed around the nest near Rowan Creek. The other nest is located near Fall Dog Creek and is in an Old Growth Land Use Designation that will not be harvested. If other goshawk nests should be found in the project area during this project we will implement the buffer requirements in the Forest Plan Standards and Guidelines.

## Summary

### Key Wildlife Habitats and Timing Restrictions

No harvest is scheduled within 1,000 feet of the beach or within 1,000 feet of estuaries. Minimum clearing widths will be used on the roads. Old growth habitat reserves have been designated in the project area for all alternatives and are shown on the alternative maps. These blocks of habitat were selected in the Forest Plan. Harvest is precluded in these areas. In addition, more old growth will remain in areas that are classified as unsuitable for timber production (such as very steep areas and stream buffers).

Helicopter flight guidelines will ensure the protection of eagle nest trees in the project area. Repeated helicopter flights within one mile of nest trees will be avoided from March 1<sup>st</sup> to May 31<sup>st</sup>. If nest trees have young, we will extend additional protection from May 31<sup>st</sup> to August 31<sup>st</sup>.

### Recreation

Most of the recreation use within the project area is water based. The primary method of mitigation for recreation is protecting the visual quality of areas seen from the water. Depending on the alternative, harvest units visible from saltwater are located and designed to reduce visual impact. Buffers along beaches, estuaries, streams and lakes also provide visual screening.

### Wild and Scenic Rivers

Two rivers in the project area, Kadake Creek and an unnamed creek at the head of Security Bay locally known as Fall Dog Creek, have been determined to be suitable for inclusion in the Wild and Scenic River System by the Forest Plan. Kadake Creek was recommended as a Recreational River for 23 miles and Fall Dog Creek was recommended as a Wild River for 4 miles. This recommendation is based on unique values identified in the Forest Plan. Their classification eligibility and outstandingly remarkable values are to be maintained until Congress designates the rivers or decides not to designate them. These will be maintained in all alternatives considered in this EIS.

## Preferred Alternative

The Preferred Alternative is Alternative 4. To recommend a Preferred Alternative, the Stikine Area Leadership Team evaluated the benefits and impacts of each alternative and gave particular consideration to how each alternative responded to the key issues. Alternative 4, goes the furthest to introduce the concepts of disturbance ecology which in conjunction with the Forest Plan old growth reserves helps to maintain wildlife habitat and addresses subsistence concerns.

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# **Chapter 1**

## **Purpose and Need**



# Chapter 1

## Purpose and Need

### Definitions

**Disturbance Ecology** – The study of disturbances and the consequences of the dynamics for the understanding of populations, communities, and ecosystems. A disturbance is any relatively discrete event in time that disrupts ecosystem, community, or population structure and changes resources, substrate availability, or the physical environment. (Pickett and White, 1985)

**Land Use Designation (LUD)** – (As used in the 1997 Forest Plan Revision:) A defined area of land with specific management direction.

**Land Use Prescriptions** – Specific management direction applied to a LUD to attain multiple use and other goals and objectives.

**MBF** – Thousand board feet of timber.

**MMBF** – Million board feet of timber.

**Scoping Process** – The process that we use to determine the significant issues for in an environmental impact statement.

**Tongass Land Management Plan (TLMP)** – The 10-year land allocation plan for the Tongass National Forest. The Forest Plan Revision was completed in 1997 and is also known as the Forest Plan.

## Introduction

Alaska Wilderness Recreation and Tourism Association (AWRTA), et.al. vs. Morrison, et.al. resulted in a settlement agreement that “maintained an injunction pending compliance with NEPA and ANILCA Section 810” for certain units approved in the North and East Kuiu Final Environmental Statement (FEIS) Record of Decision (ROD).

The un-roaded east Kuiu portion, which was the basis of a subsistence finding of “a significant possibility of a significant restriction” was separated from the already developed north Kuiu area (N&E Kuiu FEIS, 1993).

This Environmental Impact Statement (EIS) documents our efforts to comply with the AWRTA settlement agreement and make decisions about possible timber sales within the Crane and Rowan Mountain project area on north Kuiu Island. These decisions will be based upon laws and other direction and upon public needs and concerns.

In this DEIS we describe a Proposed Action and three other alternative approaches to

# 1 Purpose and Need

harvesting timber and building and maintaining roads to make timber on north Kuiu Island available for harvest within the project area. The No Action Alternative is presented and the agency's Preferred Alternative is identified. We have also disclosed the environmental effects and resource outputs expected from the Proposed Action and each of the alternatives.

We developed alternatives to address concerns from the public and from the Forest Plan. The key issues addressed are Habitat Conservation, Watershed Effects, Timber Economics and Scenery. A management strategy to maintain natural forest disturbance patterns is used to address several of the issues.

## Project Area

### Location

The Crane and Rowan Mountain project area is located about 70 miles west of Petersburg on the north end of Kuiu Island in southeast Alaska. The project area is approximately 150,000 acres in size (approximately 30% of the island) and includes value comparison units (VCU's) 398, 399, 400, 401, 402, 421 and the portion of VCU 420 that is west of Port Camden.

Kuiu Island is a moderately large island in the middle of the Alexander Archipelago, approximately 500,00 acres in size. To the east is Kupreanof Island (approximately 850,000 acres). To the west is Baranof Island (approximately 1,010,000 acres). To the south is Prince of Wales Island (the third largest island in the United States at approximately 3,000,000 acres,) and Admiralty Island (approximately 1,030,000 acres) is to the north.

## Overall Direction for the Project

National Forest planning involves several levels of decisions. The decision-making begins with long-range planning at the national level, continuing down through the regional and forest levels to the project level. This DEIS is a project level analysis that implements direction provided at these higher levels.

### National Level

The 1990 Program and Assessment, developed in accordance with the Forest and Rangeland Renewable Resources Planning Act of 1974 as amended, provides national direction for the management of national forests and grasslands. An assessment of the forest and rangeland renewable resources is required every 10 years, and development of a program for managing those resources is required every 5 years.

### Regional Level









The Alaska Regional Guide (USDA Forest Service, 1983) addresses issues specific to Alaska, and establishes management standards and guidelines for the Tongass National Forest. The Tongass Land Management Plan (TLMP, USDA Forest Service, 1997) incorporates and amends this regional direction.

### Forest Level

The National Forest Management Act of 1976 (NFMA) directs each Forest to prepare an overall plan of activities. The Tongass Land Management Plan (signed in May, 1997, and referred to as the Forest Plan or TLMP in this document) responds to NFMA and provides broad management direction for the lands and resources in the Tongass National Forest in southeast Alaska. Forest goals, anticipated outputs, and schedules of proposed management activities are included in the Forest Plan. The Forest Plan designates all Tongass National Forest land to one of 19 Land Use Designations (LUD's) or "zones" and provides standards and guidelines for each LUD to meet this multiple use mission. Figure 1-3 shows the LUDs for all of Kuiu Island (TLMP, 1997).



# Legend

-  Crane/Rowan Mt. Project Area Boundary
-  Existing System Roads
-  Shoreline, Lakes, Class I/II Streams
-  Existing Clearcut Harvest Units
-  Existing Partial Cut Harvest Units
-  Non Timber LUDs
-  Non-National Forest Lands
-  Log Transfer Facility (LTF)

**Figure 1-1**  
**Project Area**  
**Vicinity Map**



STIKINE AREA VICINITY MAP  
MAP AREA SHOWN IN DARK GREY

0 13122 26244  
Scale is 1 inch = 13122 feet

/gis/projects/crane\_rowan/plots/docmaps/vic.map  
vicinity.aml 12/28/87

Chatham Strait

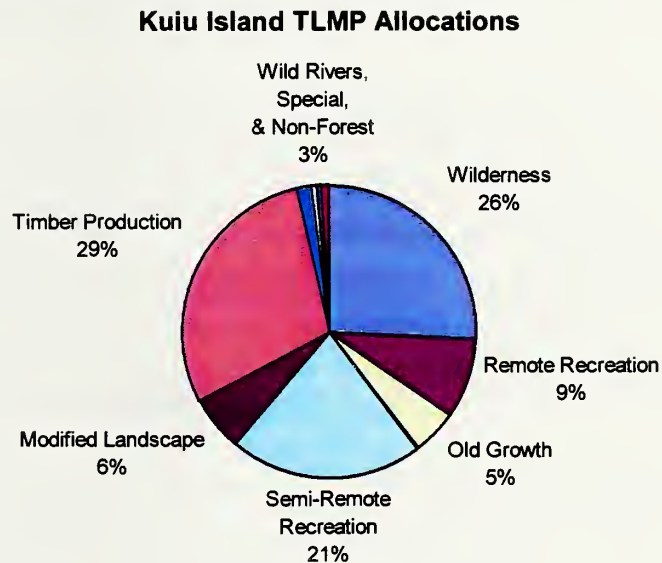






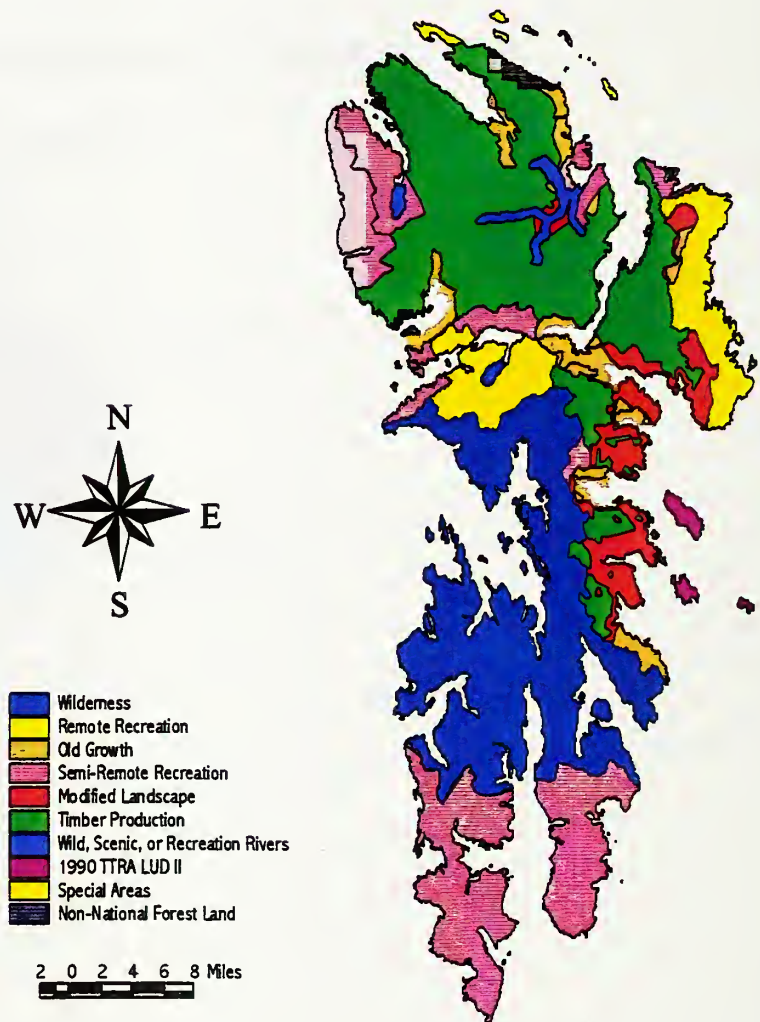
Figure 1-2 displays the breakdown in percentages of the Kuiu land use designations. The center of the island is in designated Tebenkof and Kuiu Wilderness Areas. Including the Wilderness Areas, approximately two-thirds of the island is in non-development land use designations. The other one-third is in production LUDs where timber management is allowed. Within the areas allowing timber production, the first 1000 feet of the beach fringe and estuaries have timber harvest restrictions, and all fish habitats have at least 100-foot buffers.

**Figure 1-2 Kuiu Island Land Use Designations (LUDs)**



# 1 Purpose and Need

**Figure 1-3 Kuiu Island TLMP Allocations**



## Forest Plan Direction

The Forest Plan provides a framework for considering project-level decisions such as the Crane and Rowan Mountain Timber Sales. Projects must undergo appropriate site-specific analysis, and comply with applicable requirements for public participation, environmental analysis and disclosure, and the administrative appeal procedure before a final decision and implementation.

The primary LUD for the Crane and Rowan Mountain project area is Timber Production. The western portion of Security Bay including the outside coast south past Washington Bay is Semi-Remote Recreation and includes Wild, Scenic, or Recreation River (WSR) designation for Fall Dog Creek. It is also designated a medium old growth reserve. Portions of Kadake Creek have also been designated WSR. The LUD for the west side of Port Camden is Modified Landscape in the foreground and Timber Production in the background. Old growth reserves (Old Growth LUD) have been designated on Kuiu Island that, combined with Wilderness and other areas restricting management disturbance, address wildlife viability issues (See Figure 1-3 for a map of the Kuiu LUD's).

The Desired Conditions for all LUDs are found in the Forest Plan. The Timber Management Desired Condition states: *"Suitable timber lands are managed for the production of sawtimber and other wood products on an even-flow, Long-term Sustained Yield basis; the timber yield produced contributes to a Forest-wide sustained yield. An extensive road system provides access for timber management activities, recreation uses, hunting and fishing, and other public and administrative uses; some roads may be closed, either seasonally or year-long, to address resource concerns. Management activities will generally dominate most seen areas. Tree stands are healthy and in a balanced mix of age classes from young stands to trees of harvestable age, often in 40- to 100-acre stands. Recreation opportunities, associated with roaded settings from Semi-primitive to Roaded Modified, are available. A variety of wildlife habitats, predominantly in the early and middle successional stages, are present."* (TLMP, 1997).

## Transition to the New Forest Plan

The Record of Decision for the recently signed Forest Plan recognizes four categories of timber sale projects to provide for the orderly transition to the new standards and guidelines. The Crane and Rowan Mountain Timber Sales Project falls within Category 3 which includes "timber sale projects now being planned but for which a NEPA decision document will not be signed before the effective date of the plan" (TLMP Record of Decision, 1997). Projects in Category 3 must be consistent with all applicable management direction of the revised plan, except for the new standards and guidelines for wildlife which address landscape connectivity, endemic terrestrial mammals, northern goshawk, and American marten.

These measures will be incorporated where needed in the projects in this category in a manner that is least disruptive to the design and implementation of the projects. The extent to which these measures should be incorporated into the sales will be determined through review by an Interagency Implementation Team consisting of the National Marine Fisheries Service (NMFS), Environmental Protection Agency (EPA), U. S. Fish and Wildlife Service (USF&WS) and pertinent Alaska State agencies.

A consultation meeting was held on October 9-10, 1997 with NMFS, USF&WS, EPA, ADGC, ADEC, and ADF&G (Transition meeting, 1997). All parties were asked for comments relative to the issues of wildlife landscape connectivity, endemic terrestrial mammals, northern goshawk, and American marten. The USF&WS raised a concern about the shape and location of the old growth reserve located near the head of Saginaw Bay. It was noted that none of the proposed units in the Crane and Rowan project area were near the old growth reserve in question and would therefore not have an effect on connectivity. A subsequent meeting with the USF&WS addressed their concern (see Habitat Conservation Section, Chap. 3). No other concerns were raised during this meeting.



## Purpose and Need

The Crane and Rowan Mountain Timber Sales project is proposed at this time to respond to the goals and objectives identified by the Forest Plan and to move the project area towards the desired future condition. The Forest Plan identifies the following goals for the Timber Land Use Designation lands within the project area:

- To maintain and promote industrial wood production from suitable timber lands, providing a continuous supply of wood to meet society's needs.
- To manage these lands for sustained long-term timber yields.
- To seek to provide a supply of timber from the Tongass National Forest which meets the annual and planning-cycle market demand, consistent with the standards and guidelines of this Land Use Designation.

The Crane and Rowan Mountain Timber Sales project will respond to these goals by using an ecosystem management approach to moving the project area toward the desired future condition identified by the Forest Plan. We will accomplish this by incorporating the principles of disturbance ecology. We will manage suitable timber lands for the production of sawtimber and other wood products while maintaining the natural disturbance patterns found within the project area that provide a range of wildlife habitat. More detailed information on timber market demand, local employment opportunities and timber harvest scheduling can be found in Appendix A (TLMP, 1997).

### Proposed Action

At the start of our project planning process we defined a "proposed action" so that the public and other agencies can know more about the project. The "proposed action" identified at the start of a project does not necessarily end up being the "preferred" alternative in the DEIS or the "selected" alternative described in the Record of Decision.

The Proposed Action (Alternative 2) is to harvest approximately 23 MMBF of timber from 738 acres. About 6.6 miles of specified road and 2.4 miles of temporary road would be constructed. The existing Rowan Bay log transfer facility (LTF) would be used for transport of logs by barge.

### Background

For this project, we chose to put forth as the proposed action the units as they were shown in the North and East (N&E) Kuiu EIS with the new Forest Plan Standards and Guidelines applied. The timber harvest units were originally part of the N&E Kuiu Record of Decision (N&E Kuiu FEIS, 1993) which made timber available to the Alaska Pulp Corporation under the now terminated APC long term timber sale contract. Efforts to sell portions of the N&E Kuiu units under the Stikine Area's independent timber sale program were legally challenged (AWRTA v. Morrison) resulting in a Settlement Agreement, which required further NEPA consideration. The Stikine Area then decided to separate the unroaded east Kuiu area from the already developed north Kuiu area and begin the NEPA process for the two timber sales being considered here.

The Crane and Rowan Mountain Timber Sales NEPA process began as two separate Environmental Analyses (EAs). In response to public input, we decided to document the analysis of these two proposed timber sales in this EIS.

## Decision to be Made

The Crane and Rowan Mountain Timber Sales EIS, as a project-level analysis, does not

address decisions made at higher levels such as the Forest Plan. It does implement direction provided at those higher levels.

The Stikine Area Forest Supervisor is the deciding official and will decide:

- If, where and how much harvest will occur in the Crane and Rowan Mountain project area,
- The locations and design of road construction and potential reconstruction,
- Whether there may be a significant restriction on subsistence uses,
- What mitigation measures and monitoring will be implemented, and
- The degree to which the project will mimic natural disturbance processes to maintain the natural disturbance patterns existing in the project area.

## Public Involvement

### Scoping

**“Public Scoping”** is the term used to describe the process of finding the key issues for a project by contacting interested individuals and agencies to determine their concerns. The north Kuiu project area has been the subject of many planning efforts since the 1970’s. Scoping results from those projects has been used along with the following list of letters, contacts and meetings that took place during the planning of this project.

Spring, Summer and Fall, 1997– Stikine Area Project Schedule lists this project

April, 1997 – Initial scoping letter and newspaper announcements

August, 1997 – Public Scoping Update after decision to do an EIS

August 1997 – Notice of Intent is published in the Federal Register

November, 1997 – Public Open House in Petersburg and Kake

Various meetings, field trips, and written correspondence with individuals, agencies, and organizations including: Alaska Dept. of Fish and Game, National Marine Fisheries Service, U.S. Fish and Wildlife Service, Alaska Department of Environmental Conservation, the Office of General Counsel.

## Key Issues

Based on the responses to public scoping and on internal concerns, we refined the list of preliminary issues from the scoping letters and the Notice of Intent into key issues. These issues are within the scope of project analysis and are used to create different action alternatives.

**Issue** – The degree to which each alternative affects wildlife habitat. We will focus on habitat for deer and marten.

**Comments** – Many individuals and agencies expressed concern about fragmentation and connectivity for wildlife species and their habitat requirements. Concerns were expressed regarding the goshawk, wolf, and peregrine falcon. Also of concern are the potential impacts to deer populations and their contribution to subsistence use.

**Measurement** – We will use wildlife habitat capability models to compare the changes in

### Habitat Conservation

# 1 Purpose and Need

habitat between the alternatives. We will also measure the number of acres of different prescriptions and discuss the impacts to important wildlife habitat.

We will mimic the natural disturbance processes across the landscape as a way to address forest fragmentation and connectivity. We'll measure this by comparing the forest mosaic in terms of habitat suitability at several different time periods and landscape levels. We will describe how each action alternative will contribute to the desired future condition.

## Watershed Effects

**Issue** – The degree to which watersheds are at risk for undesirable flow response and reduction in water quality.

**Comments** – The public comment included concerns about cumulative watershed effects.

**Measurement** – We calculate the proposed and cumulative road miles and harvest acres in major watersheds.

## Timber Economics

**Issue** – The degree to which each alternative provides an economic timber sale.

**Comments** – There was concern about the rising costs associated with logging especially where conventional yarding methods are replaced by helicopter yarding. The miles of existing and proposed roads were also concerns for harvest economics.

**Measurement** – We will estimate the volume to be harvested in each alternative and show the relative costs and benefits at an average market of using different yarding systems. We will also show the miles of road to be constructed and display how this affects economics.

## Scenery

**Issue** – The degree to which each alternative will affect the landscape character of the Crane/Rowan Mountain project area, and to what extent harvest units are designed to maintain scenic quality as outlined in the Forest Plan.

**Comments** – Comments were received addressing the potential impacts of timber harvesting on the scenic quality, particularly as seen from Chatham Strait and other saltwater viewing locations. Other concerns expressed maintaining a pristine condition for all of Kuiu Island. Individuals specifically mentioned scenic considerations along the face of Rowan Mountain.

**Measurement** – We will describe the Visual Quality Objective (VQO) achieved in each alternative and compare it to those adopted in the Forest Plan. We will measure the cumulative level of visual disturbance in each VCU and compare the alternatives.

## Other Environmental Considerations

Other resource issues are important, but were not used to drive alternative development. The main effects on recreation are related to the scenery issue and will be covered in that section. The other recreation effects will be minimal and similar regardless of the alternative picked. Other resources are protected to such a degree by the Standards and Guidelines in the Forest Plan and by other laws and constraints that the effects from each of the alternatives are not significant and are essentially the same. A more detailed discussion of these important resources and the protection measures used for them is in the Other Environmental Considerations section in Chapter 3 starting on page 3-51.

## Issues Outside the Scope of this Analysis

These are issues raised by the public that are beyond the scope of this document. We received



comments from people who wanted no more timber harvest on Kuiu Island and from people who wanted more of Kuiu Island to be made available for timber harvest. The difficult task of allocating land to different uses was done in the Forest Plan (TLMP, 1997). The Plan looks at multiple use for the Tongass as a whole and determines what areas are best used in what ways. These land allocation issues are outside the scope of this project level analysis.

## Federal and State Permits, Licenses, and Certifications

The appropriate permits have been obtained from the following agencies:

### U.S. Army Corps of Engineers

- Approval of discharge of dredged or fill material into waters of the United States (Section 404 of the Clean Water Act of 1977, as amended).
- Approval of construction of structures or work in navigable waters of the United States (Section 10 of the Rivers and Harbors Act of 1899).

### U.S. Environmental Protection Agency

- Storm water discharge permit.
- National Pollutant Discharge Elimination System review (Section 402 of the clean Water Act).

### State of Alaska, Department of Natural Resources

- Authorization for occupancy and use of tidelands and submerged lands.

### State of Alaska, Department of Environmental Conservation

- Certification of compliance with the Alaska Water Quality Standards (Section 401 Certification).
- Solid Waste Disposal Permit (Section 402 of the Clean Water Act).

## Legislative and Executive Orders Related to This EIS

Shown below is a list of some of the laws and executive orders pertaining to preparation of EISs on Federal lands. Some of these laws are specific to Alaska, while others pertain to all Federal lands.

- National Historic Preservation Act of 1966 (as amended)
- Wild and Scenic Rivers Act of 1968, amended 1986
- National Environmental Policy Act (NEPA) of 1969 (as amended)
- Clean Air Act of 1970 (as amended)
- Alaska Native Claims Settlement Act (ANSCA) OF 1971
- Marine Mammal Protection Act of 1972



# 1 Purpose and Need

- Endangered Species Act (ESA) of 1973 (as amended)
- Forest and Rangeland Renewable Resources Planning Act (RPA) of 1974 (as amended)
- National Forest Management Act (NFMA) of 1976 (as amended)
- Clean Water Act of 1977 (as amended)
- American Indian Religious Freedom Act of 1978
- Alaska Native Lands Conservation Act (ANILCA) of 1980
- Archeological Resources Protection Act of 1980
- Cave Resources Protection Act of 1988
- Tongass Timber Reform Act (TTRA) of 1990
- Executive Order 11988 (Floodplains)
- Executive Order 11990 (Wetlands)
- Executive Order 11593 (Cultural)
- Executive Order 12962 (Aquatic Systems and Recreational Fisheries)
- Executive Order 12898 (Environmental Justice)

In addition, the Coastal Zone Management Act (CZMA) of 1976, as amended pertains to this EIS. Federal lands are not included in the definition of the coastal zone as prescribed in the CZMA. However, the act requires that when Federal agencies conduct activities or development that affect the Coastal Zone, that agency's activities or development be consistent to the maximum extent practicable with the approved State Coastal Management Program. The U. S. Forest Service makes this determination.

The Alaska Coastal Management Plan incorporated the Alaska Forest Resources and Practices Act of 1979 (amended in 1990) as applied standards and guidelines for timber harvesting and processing. The Forest Service Standards and Guidelines and Mitigation measures described in Chapter 2 of this document are equal to or exceed State Standards.

## Availability of the Planning Record

An important consideration in preparation of this EIS has been reduction of paperwork as specified in 40 CFR 1500.4. In general, the objective is to furnish enough site-specific information to demonstrate a reasoned consideration of the environmental impacts of the alternatives and how these impacts can be mitigated.

The Planning Record contains detailed information used in creating the EIS and is available upon issuance of the EIS at the Stikine Area Supervisors Office, Petersburg, Alaska. Other reference documents such as the Tongass Land Management Plan, the Tongass Timber Reform Act, the Resources Planning Act, and the Alaska Regional Guide EIS are available at public libraries around the region as well as at the Stikine Area Supervisors Office and other Forest Service offices in the Alaska.

# **Chapter 2**

## **Purpose and Need**



# Chapter 2

## Alternatives

### Definitions

**Age Class** – A distinct generation of trees developing after a disturbance event. This is also referred to as a cohort.

**Biological Legacies** – The structural components that are retained from the previous stand into the next stand. The structural components may be snags (dead trees), coarse woody debris, and green trees (TLMP, 1997).

**Canopy** – The more or less continuous cover of branches and foliage formed collectively by the crowns of adjacent trees.

**Overstory** – The portion of trees in a forest that forms the upper most layer of foliage.

**Stand** – A group of trees occupying a specific area and sufficiently uniform in composition, age, arrangement, and condition as to be distinguished from the trees in adjoining areas.

**Understory** – Small trees, shrubs, forbs and other plants found beneath the overstory trees comprising the forest.

**Volume Strata** – Divisions of timber volume derived from the interpreted timber type (TIMTYP) and the common land unit data layer (CLU). Three volume strata (low, medium, and high) are recognized in the Forest Plan for each Administrative Area.

**Windthrow** – The act of trees being uprooted or snapped off by the wind. There are generally three types of windthrow – endemic where individual trees or small groups are blown over creating small gaps; catastrophic where a major windstorm can blow down hundreds of acres; and management related, where the clearing of trees in an area makes the adjacent standing trees vulnerable to windthrow.

## Introduction

This chapter describes the process used to develop alternatives to the Proposed Action. We discuss the alternatives in detail, summarize those alternatives dropped, identify mitigation measures, and briefly compare the alternatives. We also identify a Preferred Alternative (Alternative 4) which goes the furthest to introduce the concepts of disturbance ecology which in conjunction with the Forest Plan old growth reserves helps to maintain wildlife habitat and addresses subsistence concerns.

## Alternative Development

An alternative is a set of activities designed to accomplish the goal described in the Purpose and Need section of Chapter 1. The Proposed Action (Alternative 2) is one approach to harvesting timber in the Crane and Rowan Mountain project area. We will describe that and

## 2 Alternatives

### Natural Disturbance

three other action alternatives. These action alternatives respond to the following key issues that were identified during our public involvement process, Habitat Conservation, Watershed, Timber Economics, and Scenery.

The major concept used to address the key issues relates to the way forests develop and ecosystem processes occur over time because of natural disturbance (Nowacki and Kramer, 1997). Based on what we know about the natural disturbance on Kuiu Island, we developed alternatives to maintain key natural disturbance processes in the harvest units. By doing this, we anticipate that the effects of timber management on wildlife habitat especially, but also other resources, will be minimized while still harvesting some timber to respond to the need for timber in southeast Alaska. The extent to which we maintain natural disturbance in each alternative helps us analyze potential effects on other resources. We will discuss the degree to which each alternative maintains natural disturbance patterns and how this relates to the other key issues in Chapter 3.

The predominant agent of natural disturbance in the project area is wind. The effect of storms ranges from individual trees to entire stands blowing over. Catastrophic windstorms occur approximately every 100-years on Kuiu and well within the lifetime of dominant forest trees (Kramer, 1997). The strongest windstorms on Kuiu Island usually come from the southeast to southwest (Kramer 1997, Harris 1989). As a consequence, over the long term, forests directly exposed to windstorms originating from the south show evidence of greater disturbance than those with topographic protection (Kramer 1997). Blowdown patches frequently extend onto east- and west-facing slopes where winds tend to accelerate as they round mountain flanks (Harris, 1989). The result of windthrow on the forest landscape is a mosaic of stands of differing ages and types. Forest development following disturbance are described in Forest Stand Dynamics (Oliver and Larson, 1996) and are briefly stated below:



**Stand Initiation** – The stand initiation stage begins after large scale, natural or human induced disturbance. The former overstory is gone and a new stand begins to grow. This stage is characterized by a wide variety of plant species and continues until a new, complete, tree canopy forms and begins to shade out the understory. This generally occurs in 25 –35 years (Alaback, 1982).

**Figure 2-1** Stand Initiation Stage Resulting from Catastrophic Windthrow



## 2 Alternatives

Old Growth<sup>3</sup> – The old growth stage appears when the stand has many small groups or individual trees of different ages (Oliver and Larson, 1996). Distinct age classes are not present. Stand structure characteristics traditionally associated with old growth exist, including large and deformed trees with heavy and craggy limbs, standing snags, multiple canopy layers, and large dead wood accumulation on the forest floor and in streams, etc. Death of one or a few overstory trees permits the growth of small patches of young trees. This process is called gap phase dynamics (Oliver and Larson, 1996). Field data suggests typical times to reach the old growth stage are 250 to 600 years.

**Figure 2-4 Old Growth Stage**

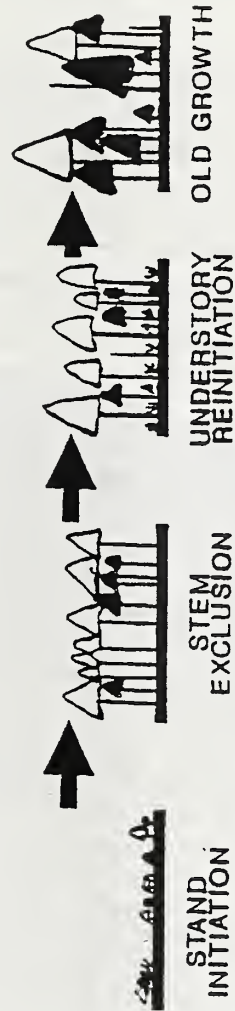


The basic progression through these four stages is graphically depicted in Figure 2-5 (Oliver, 1995). The sequence titled “A. development after stand replacing disturbance” shows the progression after a storm that blows down every tree in a stand. The sequence titled “B. development after partial disturbance” shows the progression when scattered individuals are still standing after the windthrow event. In both graphics, no further disturbance events take place allowing the stand to progress to the old growth stage.

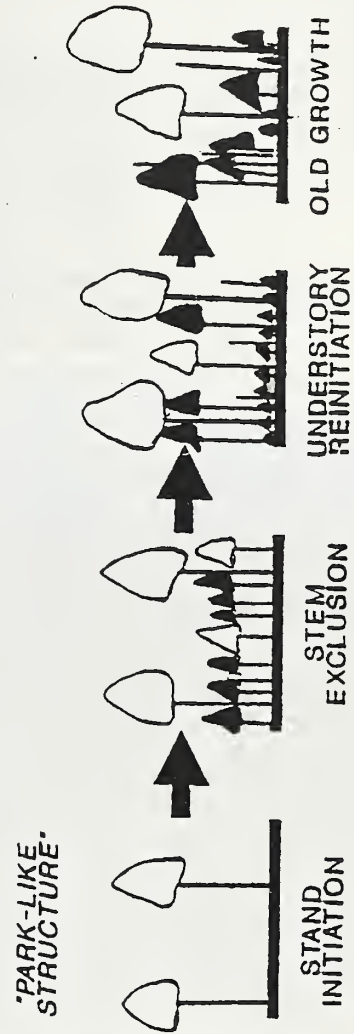
<sup>3</sup>The term ‘old growth’ has been used in many different ways. In this document, we refer to old growth as it relates to the stand development stage defined above. Others have used the term to describe esthetics, wildlife habitat, and the forest of southeast Alaska as a whole. It can also refer to stands with specific structural characteristics regardless of the processes that led to those structures (USDA Forest Service, 1992a).

Figure 2-5. Stand Development Stages following Disturbance.

**A. DEVELOPMENT AFTER STAND-REPLACING DISTURBANCE**



**B. DEVELOPMENT AFTER PARTIAL DISTURBANCE**





## 2 Alternatives

We have found that for productive western hemlock and western hemlock/Sitka spruce stands, the progression to the old growth stage usually takes place in wind sheltered areas, mostly the north facing slopes of the project area, since the strongest winds come from the south. In contrast, stands occurring on wind-exposed landscapes, seldom reach old growth as storm intervals seem to be frequent enough to restrict forests to the first three stages of development (Kramer, 1997).

On these wind-exposed landscapes, a variety of successional pathways were found to exist (Nowacki and Kramer, 1997). A common progression starts with a partial disturbance. Over time, the stand moves into the understory reinitiation stage. In this stage two distinct age classes are present in the overstory: the individuals left after the stand initiating storm and the trees that started growing right after this storm. Additionally, there is a third age class beginning to develop in the understory (see Fig. 2-1, B. Understory Reinitiation). At this point, due to the frequency of major storms, the stand is partially disturbed again (not shown in the graphic). If all the oldest trees blow over, the stand continues to develop with two age classes. If not, the stand structure becomes more complex, now containing three age classes. Many stands never develop more than three age classes, as the oldest age class continually blows over in major storms.

We propose to mimic natural disturbance on two levels: the stand level and the landscape level. At the stand level, we will mimic the pattern of repeated partial disturbance as described above by creating harvest units with two or three age classes of trees. These units will closely resemble the understory reinitiation stage following partial disturbance. In addition, we will mimic the complete stand-replacing event by creating units with few trees left, moving them to the stand initiation stage. At the landscape level, we will maintain the natural patchy pattern of stands existing after windthrow events that leave some stands completely blown down while other nearby stands are only partially blown over. We propose to do this by intermixing units that closely resemble the understory reinitiation stage right after harvest with units that are moved to the stand initiation stage.

The tools that are available for use in maintaining natural disturbance processes at the stand level are discussed in TLMP Appendix G. This appendix lists three groupings of silvicultural systems (ways of managing forests for clearly defined goals (Smith, 1962)). They are even-aged, two-aged, and uneven-aged systems. The silvicultural system applied to each proposed unit is listed on the individual unit cards found in Appendix B. There is also a discussion of which stand development stage the unit is currently in, the desired future condition of the unit, and whether the unit is expected to be in an even-aged, two-aged, or uneven-aged condition over time.

### Even-Aged Systems

Even-aged systems produce stands that consist of trees of the same or nearly the same age. This system mimics the results of stand replacing disturbance events (TLMP, 1997) and moves units to the stand initiation stage. Clear cutting is the most commonly used method in southeast Alaska to achieve even-aged results. Clear cutting will be included in all alternatives to varying degrees and for different reasons such as for maintaining a mixture of stand development stages at the landscape level and for logging practicality. For example, we chose many stands that could be logged most economically with downhill cable logging systems to be moved to the stand initiation stage when developing the patchy landscape mosaics.

## Silvicultural Systems

### Two-aged Systems

Two-aged systems produce stands that contain two age classes. These systems mimic the results of partial disturbance events and create units that closely resemble the understory reinitiation stage. The resulting stand may be two-aged or trend towards an uneven-aged condition due to the retention of reserve trees that may represent more than one age class (TLMP G-11). The specific two-aged method proposed for this project is called seed tree with reserves. In this method, all of the seed trees are retained after regeneration to carry over biological legacies of the previous stand into the new stand. We will accomplish this by prescribing diameter limits where trees within a specific diameter range can be cut. Seeds from trees that are left, especially Alaska-cedar and Sitka Spruce will be important in maintaining these species on the site (TLMP G-10).

**Figure 2-6 Diameter Limit Harvest With Some Larger Leave Trees, Age 1 Year**



During field reconnaissance we noticed many stands were naturally two-aged. In these stands the largest and oldest trees scattered through the stand were all the same age, initiated after a severe storm hundreds of years ago. Filling in between these legacies were another age class of smaller trees which got their start after a subsequent storm which only partially disturbed the stand.

We intend to maintain this pattern of two distinct *age classes* by retaining two distinct *size classes* in some units in Alternatives 3 and 4. Retained trees over a specified diameter will represent the large, old age class. Retained trees under a specified diameter will represent the smaller, younger age class. The mid-range diameter trees will be harvested to produce wood products. When the available growing space created by this harvest is filled with new young trees, we anticipate the stand to resemble the Understory Reinitiation stage of development



## 2 Alternatives

after partial disturbance as depicted in Figure 2-5, B

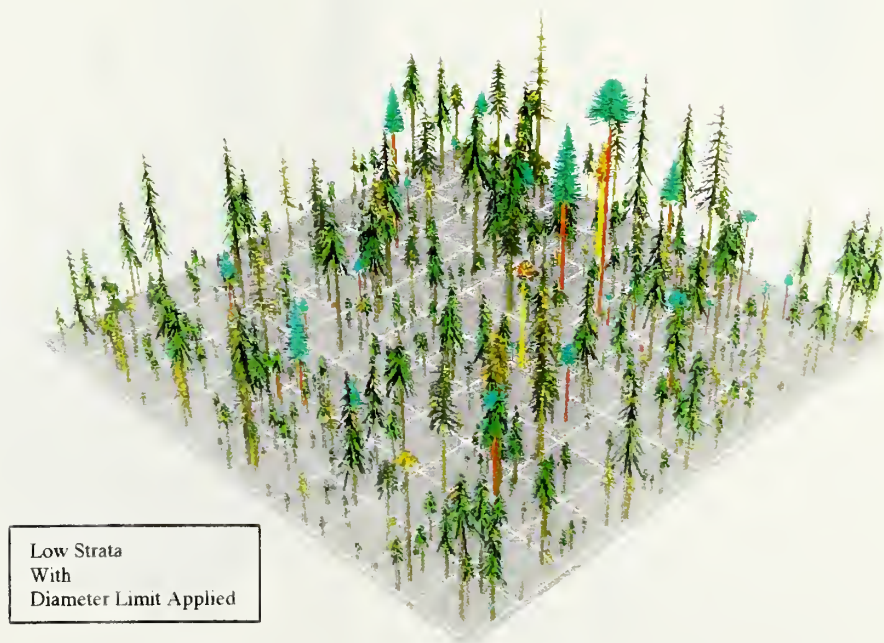
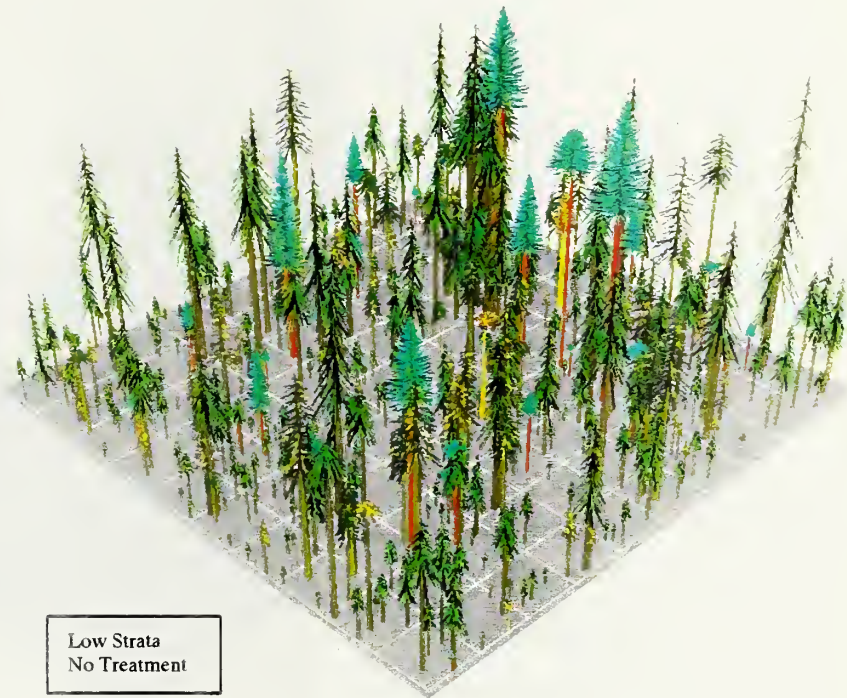
The diameter limit prescription is intended to create stands with an average of 50% of the original canopy cover remaining after harvest. The prescription will leave all hemlock and Sitka spruce trees less than 16 inches, and all Alaska-cedar less than 24 inches. In addition all western hemlocks greater than 38 inches in diameter and one large, decadent Sitka spruce for every 10 acres will be retained. Where needed additional large hemlock will be individually marked. We plan to use the same diameter limits on all units managed under the two-aged system. Depending on the size of the trees in the stand to begin with, this will result in diverse stands – some will have many trees left, other stands will have few trees left and still others will be somewhere in-between. This is typical of natural disturbance where a wide range of structural conditions exists following blowdown events (Nowacki and Kramer, 1997). Figures 2-7, 8, and 9 illustrate the changes in stand structure following application of the diameter limit harvest for the high, medium, and low volume strata in the project area.

The diameter limit cut will allow many natural disturbance processes to occur in harvest units. The variety of possible outcomes after harvest will provide a great deal of new information on how to better maintain natural ecosystem function through management. For example, in forests directly exposed to chronic windthrow, over time the greater than 38-inch trees will blow over or snap off as they decay. This will provide the forest floor with large dead wood and may serve an important role in rejuvenating site productivity through uprooting and soil churning (Bormann and others, 1995). The gaps created will stimulate understory shrub and forb production and will also give the less than 16-inch trees and the new young trees room to grow. The stand may tend to remain two-aged with remnant trees providing habitat structures for animals and shade for light-sensitive understory plants (Nowacki and Kramer, 1997). In wind sheltered areas we expect most of the trees left after harvest to remain standing. Over time these stands may trend toward uneven age conditions (TLMP, Appendix G, 1997) and maintain much of the original old-growth-like structure (Pojar and Mackinnon, 1994). In both areas we anticipate that the time these stands spend in the development stage with the least biological diversity, the stem exclusion stage, will be greatly minimized over that experienced following traditional clear cut harvest techniques.

### **Uneven-aged Systems**

The last silvicultural systems listed in TLMP Revision Appendix G are the uneven-aged systems. These systems are methods of maintaining a many-aged stand with differing tree heights and layers by removing some trees in all age groups either singly, in small groups, or in strips. The first feature of these systems that TLMP lists is complexity of harvesting. We considered prescribing an uneven-aged system on the north aspects where small canopy gap processes predominate, but concluded that we could meet our habitat conservation objective more simply with a two-aged system. This was also a way of giving consideration to the timber economics issue, since the stands we are proposing to operate in with this project are all located in a Timber Production Land Use Designation.

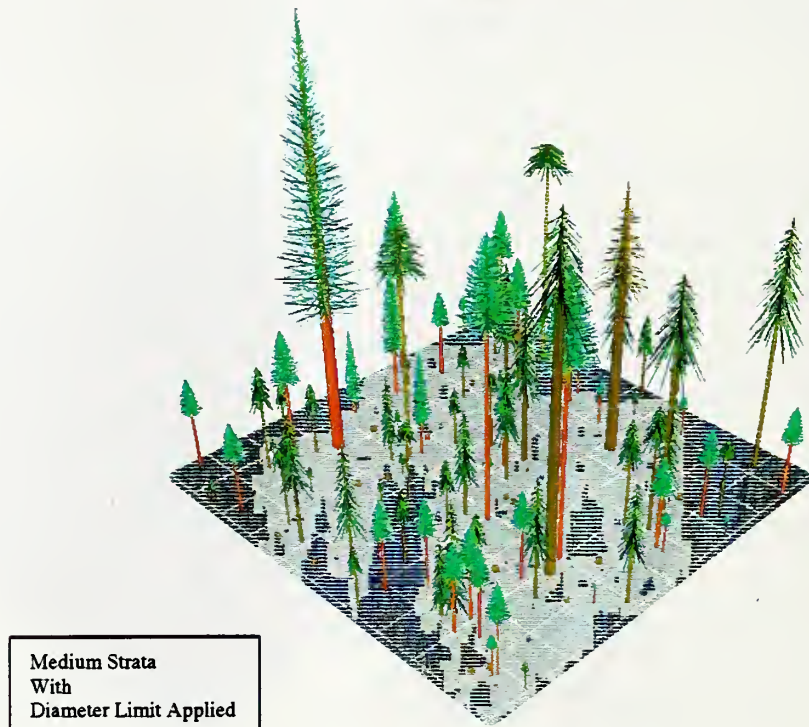
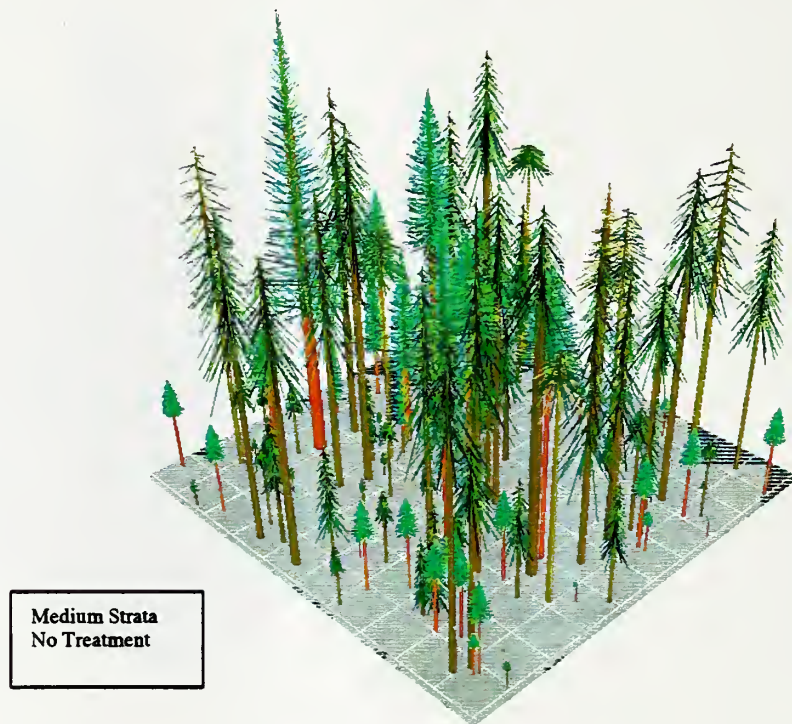
**Figure 2-7.** Low Volume Strata with and without a Diameter Limit Prescription.



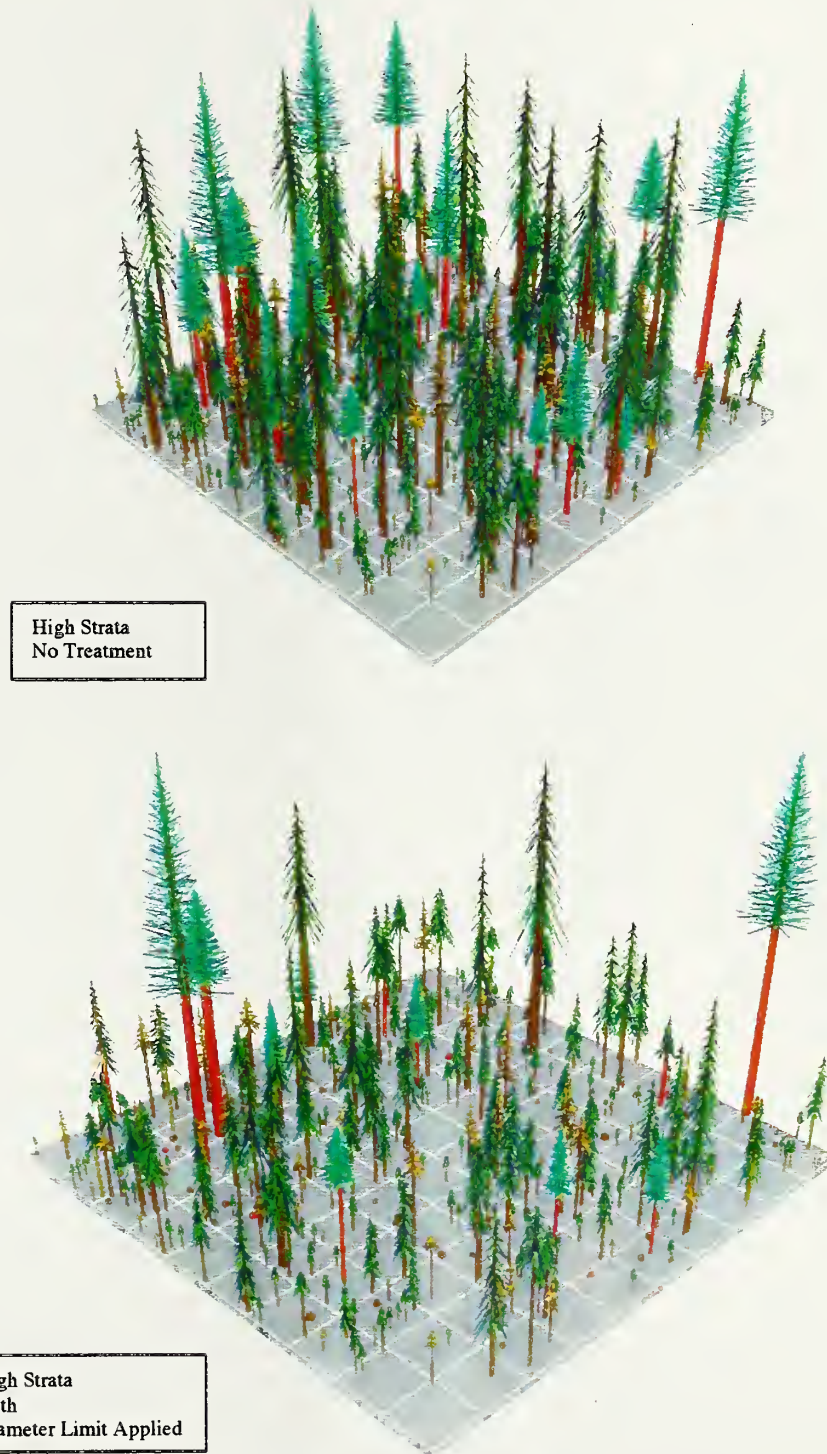


## 2 Alternatives

**Figure 2-8. Medium Volume Strata with and without a Diameter Limit Prescription.**



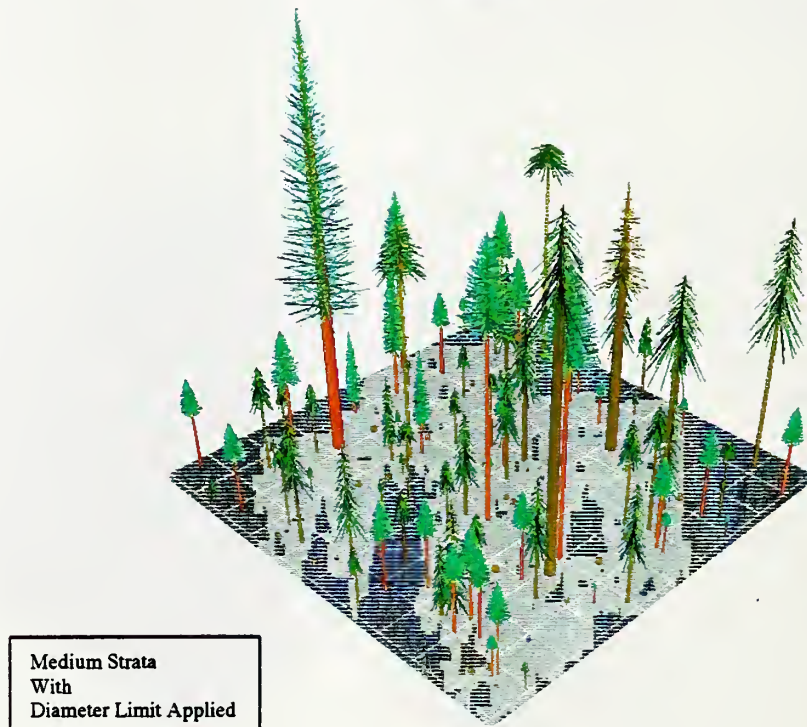
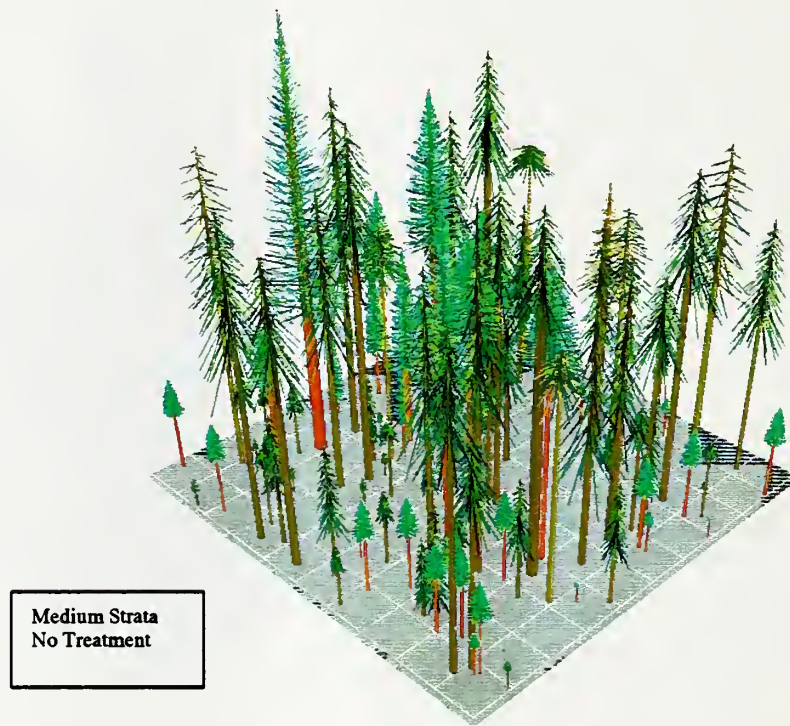
**Figure 2-9.** High Volume Strata with and without a Diameter Limit Prescription.



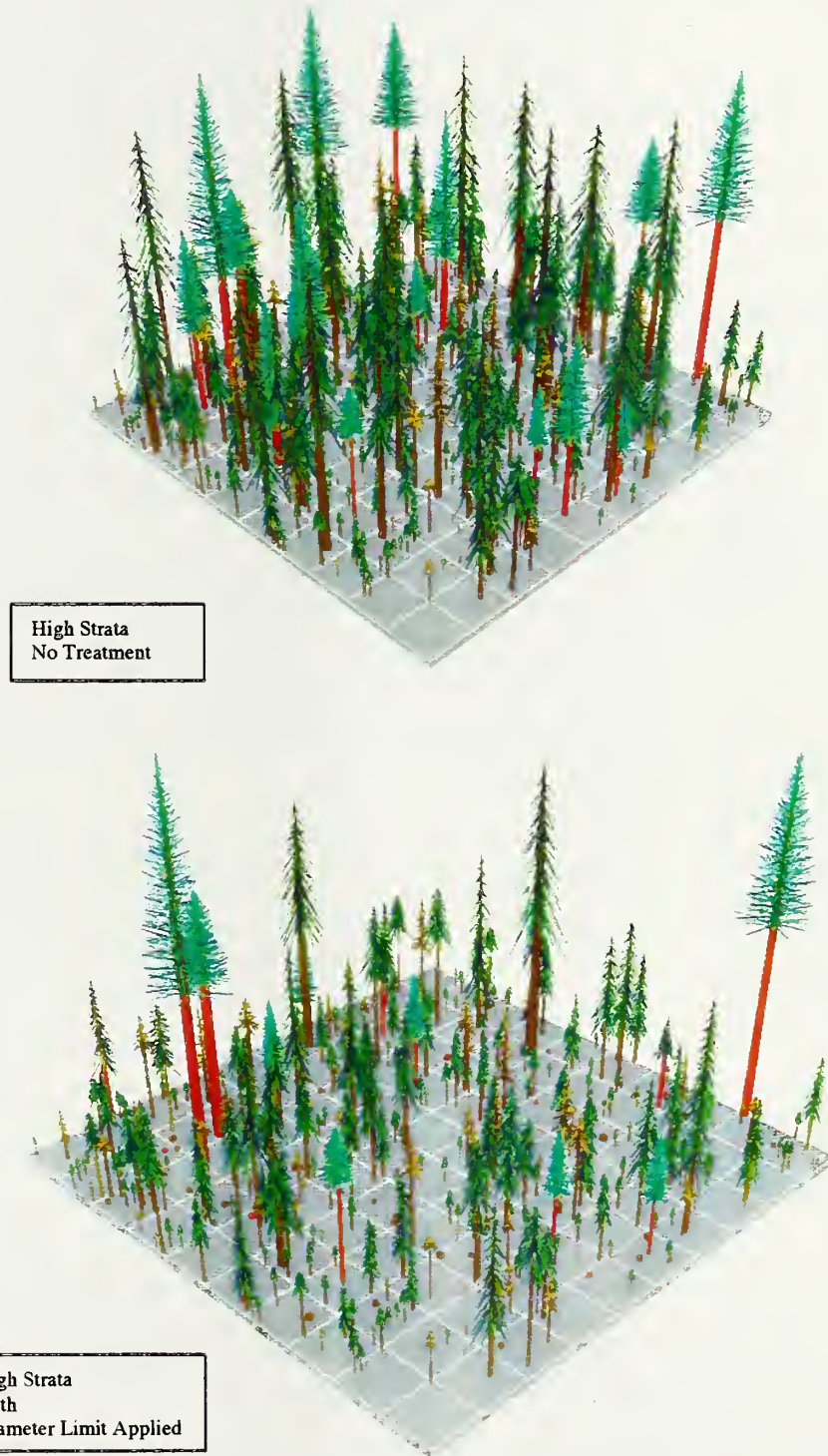


## 2 Alternatives

**Figure 2-8.** Medium Volume Strata with and without a Diameter Limit Prescription.



**Figure 2-9.** High Volume Strata with and without a Diameter Limit Prescription.





## 2 Alternatives

### Alternatives Considered in Detail

#### Alternative 1 (No Action)

With this alternative we analyze the effects of having no timber sale or road construction in the Crane and Rowan Mountain project area. This alternative is provided so that you can see the changes that the other alternatives have on the social, physical, and biological environment. This alternative is the most responsive to maintaining current wildlife habitat, scenery and watershed condition by deferring harvest. It would not contribute to local employment or income and would not move the project area toward the desired future condition that is stated in the Forest Plan. Table 2-1 and Figure 2-10 display the no action alternative.

#### Alternative 2 (Proposed Action)

The proposed action would harvest approximately 23 MMBF of timber from about 738 acres. It would offer the second most volume to potential large and small operators and provides the best economic return of all of the alternatives. Table 2-1 and Figure 2-11 display the specific activities. All of this harvest would be clear cut<sup>4</sup> and would use cable or helicopter yarding. Approximately 6.59 miles of specified road and 2.42 miles of temporary road would be constructed to access some of this timber and provide infrastructure for future sales. This and all other action alternatives will use the existing Rowan Bay LTF for log barging. This alternative serves as the basis of comparison for the other alternatives.

#### Alternative 3

Alternative 3 responds primarily to public concerns surrounding wildlife habitat, scenery and watershed resources. Harvesting some units as partial cuts rather than clear cuts would reduce fragmentation and watershed and visual impacts. This alternative would harvest approximately 17.8 MMBF of timber from about 738 acres. This includes 210 acres of clear cut with reserves and 528 acres of partial harvest. Approximately 6.59 miles of specified road and 2.42 miles of temporary road would be constructed to access some of this timber and provide infrastructure for future sales. This and all other action alternatives will use the existing Rowan Bay LTF for log barging. Table 2-1 and Figure 2-12 display the specific activities involved in Alternative 3.

#### Alternative 4 (Preferred)

Alternative 4 responds to the timber economics, wildlife habitat and fragmentation, scenery and watershed issues. Alternative 4 comprises all of the units in Alternative 2 except for two. One clear cut unit in the Security Creek watershed was dropped to lower the risk to watershed resources. On Rowan Mountain, one clear cut unit was dropped and other partial harvest units enlarged or added to better maintain natural disturbance patterns. This alternative would harvest approximately 24 MMBF of timber from about 1056 acres. This includes 159 acres of clear cut with reserves and 897 acres of partial harvest. Approximately 6.59 miles of specified road and 1.4 miles of temporary road would be constructed to access some of this timber and provide infrastructure for future sales. This and all other action alternatives will use the existing Rowan Bay LTF for log barging. Table 2-1 and Figure 2-13 display the specific activities involved in Alternative 4.

#### Alternative 5

Alternative 5 responds primarily to public concerns surrounding watershed resources and timber economics. This alternative drops all harvest from the Security Creek watershed in order to lower the risk to the watershed resource. Dropping these units would also decrease fragmentation and the impacts to the visual resource in this watershed. This alternative then uses all of the other clear cut units from Alternative 2 and adds units 402-50 and 402-51 on Rowan Mountain to provide more timber volume. This alternative would harvest approximately 21 MMBF of timber from about 712 acres. This includes 546 acres of clear

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<sup>4</sup> Clear cutting is an even aged silvicultural system used to manage forest stands. All clear cut systems planned in this project will include retention of wildlife legacies.

cut with reserves and 163 acres of partial harvest. Approximately 6.59 miles of specified road and 1.49 miles of temporary road would be constructed to access some of this timber and provide infrastructure for future sales. This and all other action alternatives will use the existing Rowan Bay LTF for log barging. Table 2-1 and Figure 2-14 display the specific activities involved in Alternative 5.

**Table 2-1. Harvest Units in Alternatives by Prescription (Shading is Helicopter)**

UNIT	ALT 1		ALT 2		ALT 3		ALT 4		ALT 5	
Prescription	CC	DL	CC	DL	CC	DL	CC	DL	CC	DL
399-13	NC	NC	64	0	50	14	50	14	64	0
400-8	NC	NC	29	0	29	0	NC	NC	NC	NC
400-9	NC	NC	33	0	0	33	0	33	NC	NC
400-11	NC	NC	26	0	0	26	0	26	NC	NC
400-12	NC	NC	79	0	0	79	0	79	NC	NC
400-18	NC	NC	59	0	0	59	0	59	59	0
400-22	NC	NC	NC	NC	NC	NC	0	228	NC	NC
402-25	NC	NC	22	0	22	0	NC	NC	22	0
402-26	NC	NC	25	0	17	8	17	8	25	0
402-27	NC	NC	16	0	16	0	16	0	16	0
402-28	NC	NC	7	0	4	3	4	3	7	0
402-29	NC	NC	23	0	0	23	0	23	0	23
402-30	NC	NC	10	0	0	10	0	10	10	0
402-31	NC	NC	8	0	0	8	0	8	8	0
402-32	NC	NC	22	0	0	22	0	22	22	0
402-49	NC	NC	15	0	10	5	10	5	15	0
402-50	NC	NC	NC	NC	NC	NC	0	106	0	106
402-51	NC	NC	NC	NC	NC	NC	0	35	0	35
420-46	NC	NC	38	0	0	38	0	38	38	0
420-47	NC	NC	27	0	0	27	0	27	27	0
420-48	NC	NC	42	0	8	34	8	34	42	0
421-49	NC	NC	97	0	29	68	29	68	97	0
421-50	NC	NC	39	0	12	27	12	27	39	0
421-51	NC	NC	57	0	13	44	13	44	57	0



# 2 Alternatives

UNIT	ALT 1		ALT 2		ALT 3		ALT 4		ALT 5	
Prescription	CC	DL	CC	DL	CC	DL	CC	DL	CC	DL
<b>TOTAL</b>	0	0	738	0	210	528	159	897	548	164

## Alternative Comparison

**Table 2-2** Alternative Comparison

Issue	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
<b>Wildlife Habitat</b>					
Deer Habitat Capability Year 2030	81%	80%	80%	80%	80%
POG <sup>5</sup> Harvested – Project Area	0	0.64%	0.41%	0.52%	0.54%
<b>Scenery</b>					
VQO Achieved	R	PR/MM	PR/M	R/PR	PR/MM
Forest Plan VQO	M/MM	M/MM	M/MM	M/MM	M/MM
<b>Timber Economics</b>					
Harvest Volume (MMBF)	0	23.0	17.8	24.0	21.0
Specified Road (miles)	0	6.59	6.59	6.59	6.59
Temporary Road (miles)	0	2.42	2.42	1.40	1.49
Net Stumpage Value	0	\$48.88	\$5.72	\$19.52	\$34.45
Indicated Advertised Rates	0	\$93.09	\$64.64	\$63.35	\$84.23
<b>Watershed Effects</b>					
Dean Creek Second Growth (% of watershed)	31.2	32.2	31.2	31.2	32.2
Dean Creek Open Road Density (Miles/Sq.Mi.)	0.91	0.91	0.91	0.91	0.91
Security Cr. Second Growth	23.0	25.8	23.0	23.0	23.0

<sup>5</sup> POG is “Productive Old Growth” as defined in the Forest Plan.

Issue	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
(% of watershed)					
Security Cr. Open Road Density (Miles/Sq.Mi.)	0.98	0.98	0.98	0.98	0.98

## Alternatives Dropped From Further Review

We considered including the original selected alternative from the N&E Kuiu EIS as an alternative in this EIS. This alternative was dropped, however, because it doesn't meet the Standards and Guidelines found in the Forest Plan.

## Mitigation Measures for the Action Alternatives

The Forest Service uses a variety of mitigation measures in the design and implementation of timber sales to avoid or reduce impacts to the environment. Law requires some of these mitigation measures; for example, streamside buffers. Some are included as direction from the Forest Plan. Others are very specific to a particular location or unit. These actions and their site-specific application are documented on the unit and road cards in Appendix B. Described below are the mitigation measures we will use for this project under all action alternatives.

### Cultural Resources

Based on inventory work in the Crane and Rowan Mountain project area and elsewhere in southeast Alaska, we developed a model to help us locate those areas where cultural resources are most likely to be found. This model helps identify areas where we will intensively survey for cultural sites prior to any ground-disturbing activity. If additional cultural resources are located, appropriate mitigation and protection will be designed in consultation with the Alaska State Historic Preservation Officer.

### Best Management Practices

Best Management Practices (BMPs) are practices for operating procedures designed to protect water quality. The development of BMPs is mandated by the Clean Water Act. The BMPs for the Tongass National Forest are the result of extensive efforts between the Forest Service and the State of Alaska to identify practices that will ensure that timber harvest activities minimize soil erosion and protect aquatic habitat. The unit and road cards in Appendix B describe site-specific application of BMPs.

### Stream-side Buffers

The Tongass Timber Reform Act mandates a minimum 100-foot wide, no-harvest buffer on both sides of all Class I streams and on those Class II streams that flow directly into Class I streams. The Forest Plan Riparian Standards and Guidelines provide further direction for protection of riparian management areas. Many streamside buffers are wider than the 100 foot TTRA buffer. Specific information about streamside buffers is located on the unit cards in Appendix B.

### Marbled Murrelets

Marbled murrelets are common in the waters around the analysis area. No known nests have been located. If a nest sited is located, a 30-acre buffer surrounding the nest will be provided.

## 2 Alternatives

Roads can enter this buffer if unavoidable, but every effort will be made to protect the nest site.

### Goshawks

The goshawk is not presently classified as Threatened and Endangered but it is recognized as a Regional Sensitive Species. Two goshawk nests are known to exist in the project area. A 100 acre buffer has been placed around the nest near Rowan Creek. The other nest is located near Fall Dog Creek and is in an Old Growth Land Use Designation that will not be harvested. If other goshawk nests should be found in the project area during this project we will implement the buffer requirements in the Forest Plan Standards and Guidelines.

### Key Wildlife Habitats and Timing Restrictions

No harvest is scheduled within 1,000 feet of the beach or within 1,000 feet of estuaries. Minimum clearing widths will be used on the roads. Old growth habitat reserves have been designated in the project area for all alternatives and are shown on alternative maps. These blocks of habitat were selected in the Forest Plan. Harvest is precluded in these areas. In addition, more old growth will remain in areas that are classified as unsuitable for timber production (such as very steep areas and stream buffers).

Helicopter flight guidelines will ensure the protection of eagle nest trees in the project area. Repeated helicopter flights within ¼ mile of nest trees will be avoided from March 1<sup>st</sup> to May 31<sup>st</sup>. If nest trees have young, we will extend additional protection from May 31<sup>st</sup> to August 31<sup>st</sup>.

### Recreation

Most of the recreation use within the project area is water based. The primary method of mitigation for recreation is protecting the visual quality of areas seen from the water. Depending on the alternative, harvest units visible from saltwater are located and designed to reduce visual impact. Buffers along beaches, estuaries, streams and lakes also provide visual screening.

### Wild and Scenic Rivers

Two rivers in the project area, Kadake Creek and an unnamed creek at the head of Security Bay locally known as Fall Dog Creek, have been determined to be suitable for inclusion in the Wild and Scenic River System by the Forest Plan. Kadake Creek was recommended as a Recreational River for 23 miles and Fall Dog Creek was recommended as a Wild River for 4 miles. This recommendation is based on unique values identified in TLMP. Their classification eligibility and outstandingly remarkable values are to be maintained until Congress designates the rivers or decides not to designate them. These will be maintained in all alternatives considered in this EIS.

## Preferred Alternative

The Preferred Alternative is Alternative 4. To recommend a preferred alternative, the Stikine Area Leadership Team evaluated the benefits and impacts of each alternative and gave particular consideration to how each alternative responded to the key issues. Alternative 4 goes the furthest to introduce the concepts of disturbance ecology which in conjunction with the Forest Plan old growth reserves helps to maintain wildlife habitat and addresses subsistence concerns.

## Project Implementation

During the implementation of a timber harvest project it is not uncommon to learn about site characteristics and site specific resource relationships that may not have been known during the planning process. This additional information may lead to more effective ways to



accomplish project objectives, either in the form of more efficient operations or better resource protection, than what was designed at the planning stage. A need to modify the project may result from this new or refined information.

Any proposed changes to this project will be subject to an appropriate interdisciplinary review process. All changes will be subject to the documentation, public involvement, and other requirements of the National Environmental Policy Act (NEPA), the National Forest Management Act (NFMA), section 810 of the Alaska National Interest Lands Conservation Act (ANILCA), the Coastal Zone Management Act (CZMA) and other laws concerning proposed actions.

All changes to project design shall be documented and approved prior to implementation. The Stikine Area Forest Supervisor or, if so designated, the Petersburg District Ranger, will be the deciding officer for any such changes. In determining whether and what kind of further NEPA action is required, the deciding officer will consider the criteria for whether to supplement an existing environmental impact statement (EIS) in 40 CFR 1502.9(c), and in particular, whether the proposed change is a substantial change to the Record of Decision selected alternative, and whether the change is relevant to environmental concerns. The deciding officer will consider whether an environmental assessment (EA) to determine whether a supplement to the existing EIS is required, or whether the change is categorically excluded from preparation of an EIS or EA on the basis of the criteria in Forest Service Handbook (FSH) 1909.15.26.

Minor changes to harvest units, transportation facilities or other project components are expected in a timber harvest project and may be categorically excluded from documentation in an EA or EIS, and will not present sufficient potential impacts to require any specific documentation or other action to comply with other laws. Minor changes may still require appropriate scoping, environmental analysis, documentation in a Decision Memo, and public notice to comply with FSH 1909.15.27.

## Monitoring

Monitoring is designed to determine if the resource objectives of the project have been met. Monitoring is the process of measuring how well the predictions made, the prescriptions assigned, and the determinations decided, achieve the desired results as implemented. The objective of monitoring and evaluating project implementation is to determine (1) if all activities undertaken as part of this project are consistent with the Forest Plan and the Record of Decision for this project, (2) effectiveness of standards and guidelines, (3) costs and effects of project implementation, and (4) need for changes to the decision.

All action alternatives are subject to monitoring and reporting requirements contained in the Forest Plan and in Forest Service Manuals and Handbooks. Monitoring requirements are an essential part of the implementation of this project. Evaluating and reporting results is an essential part of the monitoring process. The Petersburg Ranger District personnel will prepare an annual report which will be available for review in that office.

The Forest Service uses three classifications for monitoring activities: implementation monitoring, effectiveness monitoring, and validation monitoring. A description of these three types is given below. Specific monitoring items for this project are described on the following pages. Some monitoring items, like research efforts to validate models (such as habitat capability models used in this planning process), and program reviews (such as reviews conducted on a regular basis to assess the quality of engineering work) are not



## 2 Alternatives

specific to this project and so are not listed on the following pages. They still constitute an important form of monitoring and may include looking at various aspects of this project.

### Implementation Monitoring

Implementation monitoring answers the question "Did we do what we said we would do?". It is accomplished primarily through harvest and contract inspections by trained sale administrators and contract inspectors as a routine part of project implementation. Sale administrators and contract inspectors have the authority to initiate remedial action including repair of damage that may have been caused by a contractor and suspension of activities under contract until problems have been corrected. This will ensure that all elements of the project are implemented as designed and that standards and guidelines are implemented to protect soil productivity, water quality, fish habitat, and other resources.

### Effectiveness Monitoring

Effectiveness monitoring answers the question "Did our actions accomplish what we intended, and are they the most efficient way to accomplish what we intended?". Effectiveness monitoring is especially important for evaluating the effectiveness of mitigation measures. The results of this monitoring will be evaluated and compared to expected results at least annually during the life of this project. This kind of monitoring can provide information that may trigger some form of corrective action and also provides a valuable feedback loop for resource specialists and line officers responsible for project planning.

### Validation Monitoring

Validation monitoring is conducted to determine if management actions are resolving important issues. The objective of validation monitoring is to answer the question, "Are we achieving what we intended to achieve?". Normally, validation monitoring is conducted to determine if initial assumptions used to develop alternatives and estimate effects are correct. In some cases it includes cooperative studies with research to test and evaluate predictive models such as wildlife habitat relationships or watershed impacts.

### Monitoring Plan

#### Best Management Practices Implementation

##### Objective:

Evaluate application of BMPs for water quality and fish habitat protection.

##### Method:

Follow Alaska Region BMP implementation monitoring protocols. Randomly select completed roads and units with high priority assigned to sites with high risk.

##### Action:

If protection is inadequate, apply corrective measures. If protection measures are inadequate or unsuitable, modify future recommendations.

##### Cost:

Approximately \$1,000

#### Best Management Practices Effectiveness

##### Objective:

Address priorities indicated in Tongass National Forest effectiveness monitoring strategy. Monitoring sites may or may not be selected within the Crane and Rowan Mountain project area.

##### Action:

If protection is inadequate, modify BMP.

##### Cost:

Variable

## **Prescription Accomplishment**

### **Objective:**

To determine if the Diameter Limit Prescription accomplished the following:

- Does the diameter limit achieve the canopy closure objective?
- Does the diameter limit result in the expected difference between wind prone and wind sheltered stands of large tree windthrow after harvest? (i.e. will stands trend toward 2-aged or uneven-aged as expected?)
- Does the diameter limit result in the expected understory response after harvest?
- Does the diameter limit result in the expected snow intercept?
- Does the diameter limit provide the expected protection to class III stream buffers?

### **Method:**

To determine if this objective has been met, IDT members will do field reviews of selected units and document the results

### **Action:**

The results will be used to develop future prescriptions

### **Cost:**

Approximately \$10,000

## **Scenic Resources**

### **Objective:**

Determine if harvest prescriptions were effective in meeting the visual quality objective.

### **Method:**

IDT will evaluate harvest implementation and effectiveness two years following harvest.

### **Action:**

Adjust prescriptions as needed for future planning efforts.

### **Cost:**

Approximately \$5,000

## **Watershed Resources**

### **Objective:**

To determine if harvest prescriptions were effective in providing protection to the watershed resource

### **Method:**

Measure streambed particle size distribution using the technique developed by Berenger and King (1995).

### **Action:**

Adjust prescription for future activities as needed.

### **Cost:**

Approximately \$10,000

## **Regeneration**

### **Objective:**

To determine if there is adequate natural stocking within each unit four years after timber harvest.

## 2 Alternatives

**Method:**

Field transects of each unit harvested.

**Action:**

If inadequate stocking is indicated, planting will be considered.

Approximately \$15,000

**Wildlife – Deer Response**

**Objective:**

How do deer utilize the diameter limit cuts in comparison to areas unharvested and harvested using conventional clear cut methods.

**Method:**

Deer pellet group counts.

**Action:**

Conduct pellet group counts annually for five years, then every five years.

**Cost:**

Approximately \$10,000



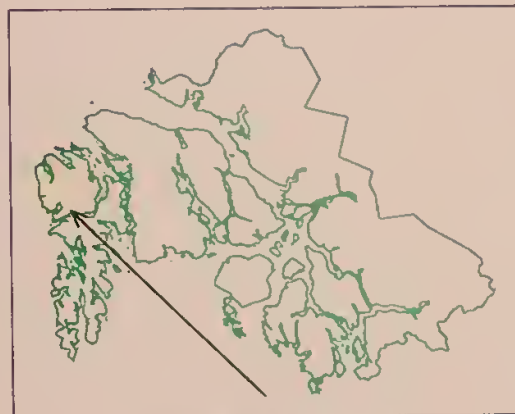
# Legend

- Existing Partial Harvest > 30 Yrs
- Existing Clearcut > 30 Yrs
- Existing/Planned Clearcut = < 30 Yrs
- Proposed Clearcut Harvest Units
- Proposed Diameter Limit Harvest Units
- Lakes and Salt Water

## FOREST WIND DISTURBANCE PROBABILITY:

- Low (Gap Phase Processes)
- Modarate (Mixed Disturbance Processes)
- High (Stand Replacament Processes)

- Non-Timber Production LUDs
- Helicopter Yarding
- Non-National Forest Lands
- Crane/Rowan Mt Project Area Boundary
- Existing or Planned System Roads
- Existing or Planned Closed Roads
- Proposed System Roads
- Proposed Temporary Roads
- 500-ft Contours



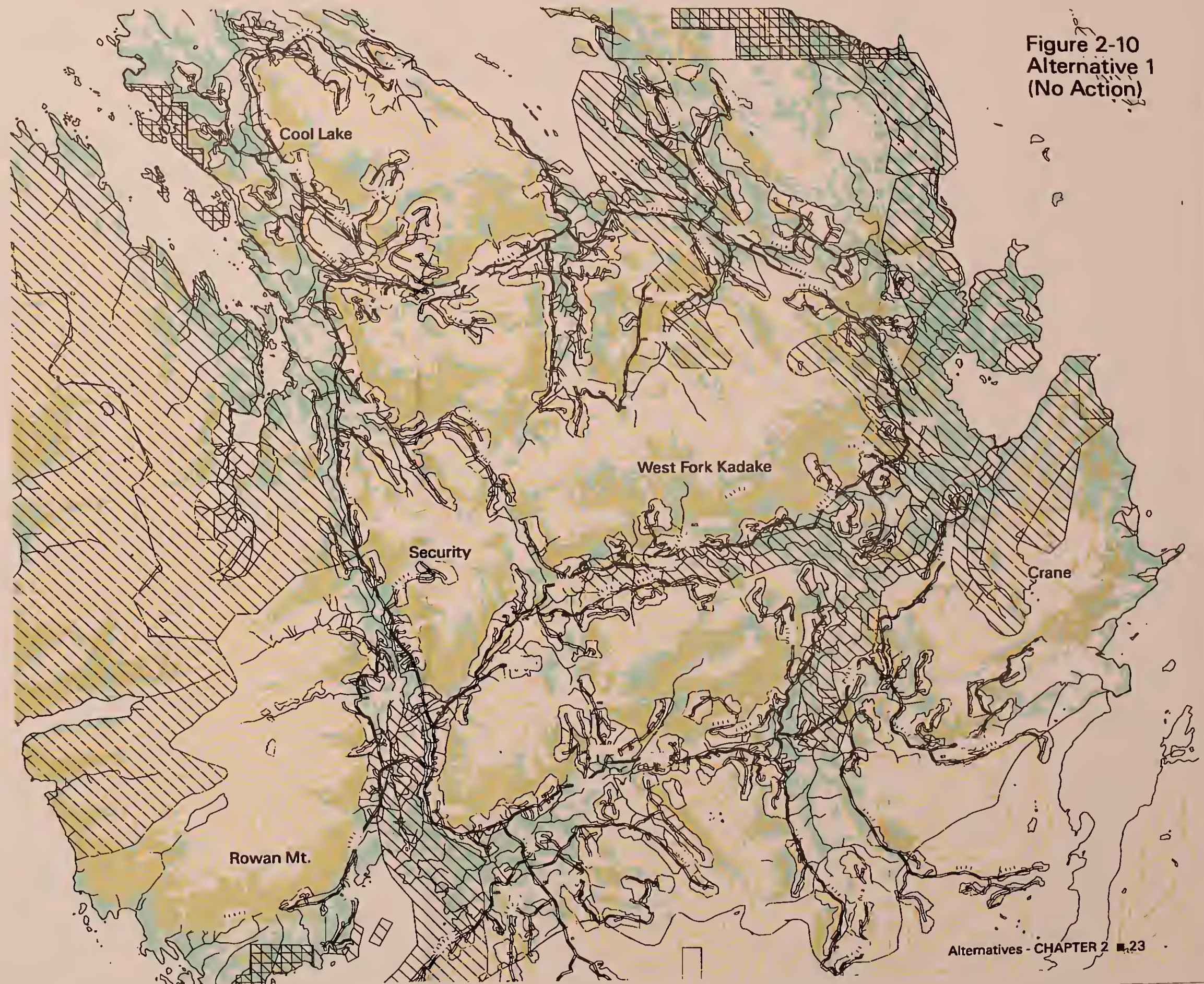
STIKINE AREA VICINITY MAP  
MAP AREA SHOWN IN ORANGE

0 7920 15840  
Scale is 1 inch = 7920 feet

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Crane/Rowan Mountain Timber Harvest  
Draft EIS

Figure 2-10  
Alternative 1  
(No Action)



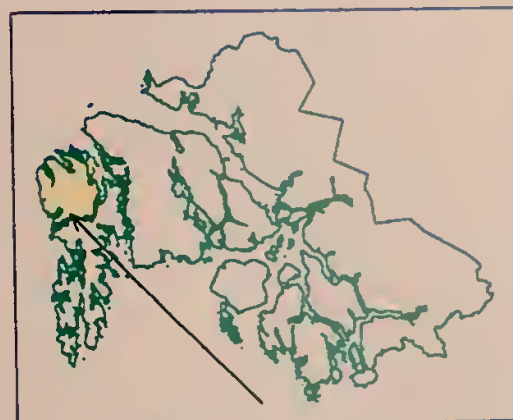






# Legend

- Existing Partial Harvest > 30 Yrs
- Existing Clearcut > 30 Yrs
- Existing/Planned Clearcut = < 30 Yrs
- Proposed Clearcut Harvest Units
- Proposed Diameter Limit Harvest Units
- Lakes and Salt Water
- FOREST WIND DISTURBANCE PROBABILITY:
  - Low (Gap Phase Processes)
  - Moderate (Mixed Disturbance Processes)
  - High (Stand Replacement Processes)
- Non-Timber Production LWDs
- Helicopter Yarding
- Non-National Forest Lands
- Crane/Rowan Mt Project Area Boundary
- Existing or Planned System Roads
- Existing or Planned Closed Roads
- Proposed System Roads
- Proposed Temporary Roads
- 500-ft Contours



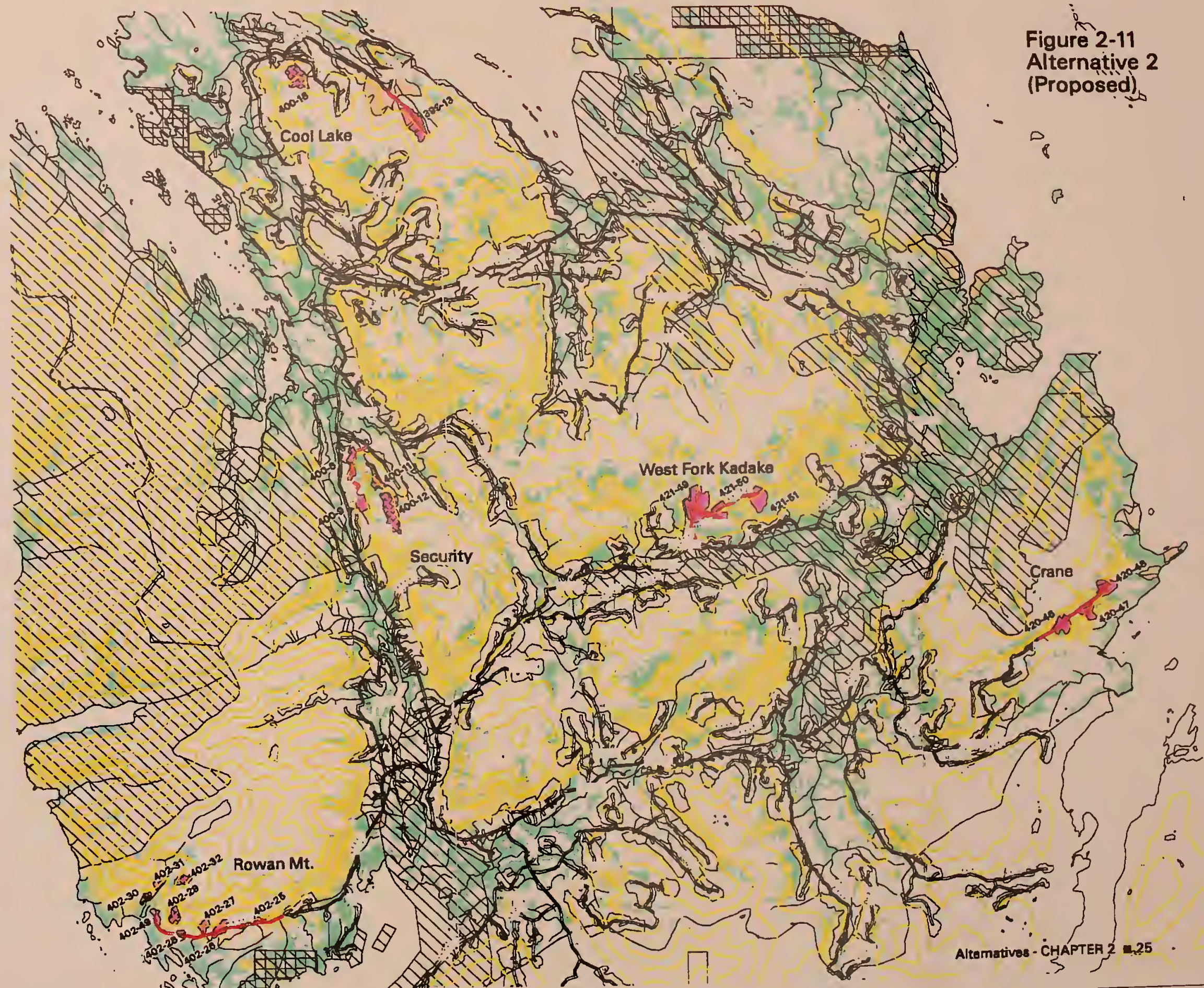
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Crane/Rowan Mountain Timber Harvest  
Draft EIS

Figure 2-11  
Alternative 2  
(Proposed)



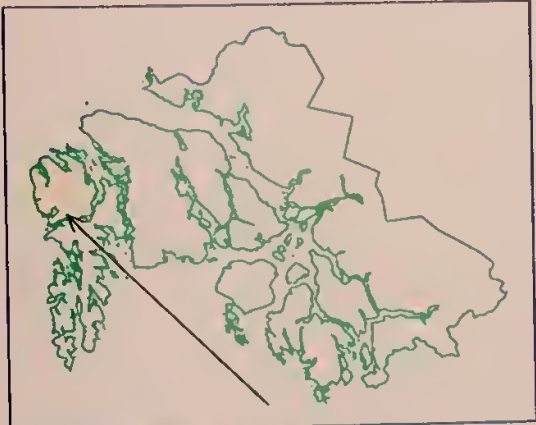






Legend

- Existing Partial Harvest > 30 Yrs
- Existing Clearcut > 30 Yrs
- Existing/Planned Clearcut = < 30 Yrs
- Proposed Clearcut Harvest Units
- Proposed Diameter Limit Harvest Units
- Lakes and Salt Water
- FOREST WIND DISTURBANCE PROBABILITY:
  - Low (Gap Phase Processes)
  - Moderate (Mixed Disturbance Processes)
  - High (Stand Replacement Processes)
- Non-Timber Production LUDs
- Helicopter Yarding
- Non-National Forest Lands
- Crane/Rowan Mt Project Area Boundary
- Existing or Planned System Roads
- Existing or Planned Closed Roads
- Proposed System Roads
- Proposed Temporary Roads
- 500-ft Contours

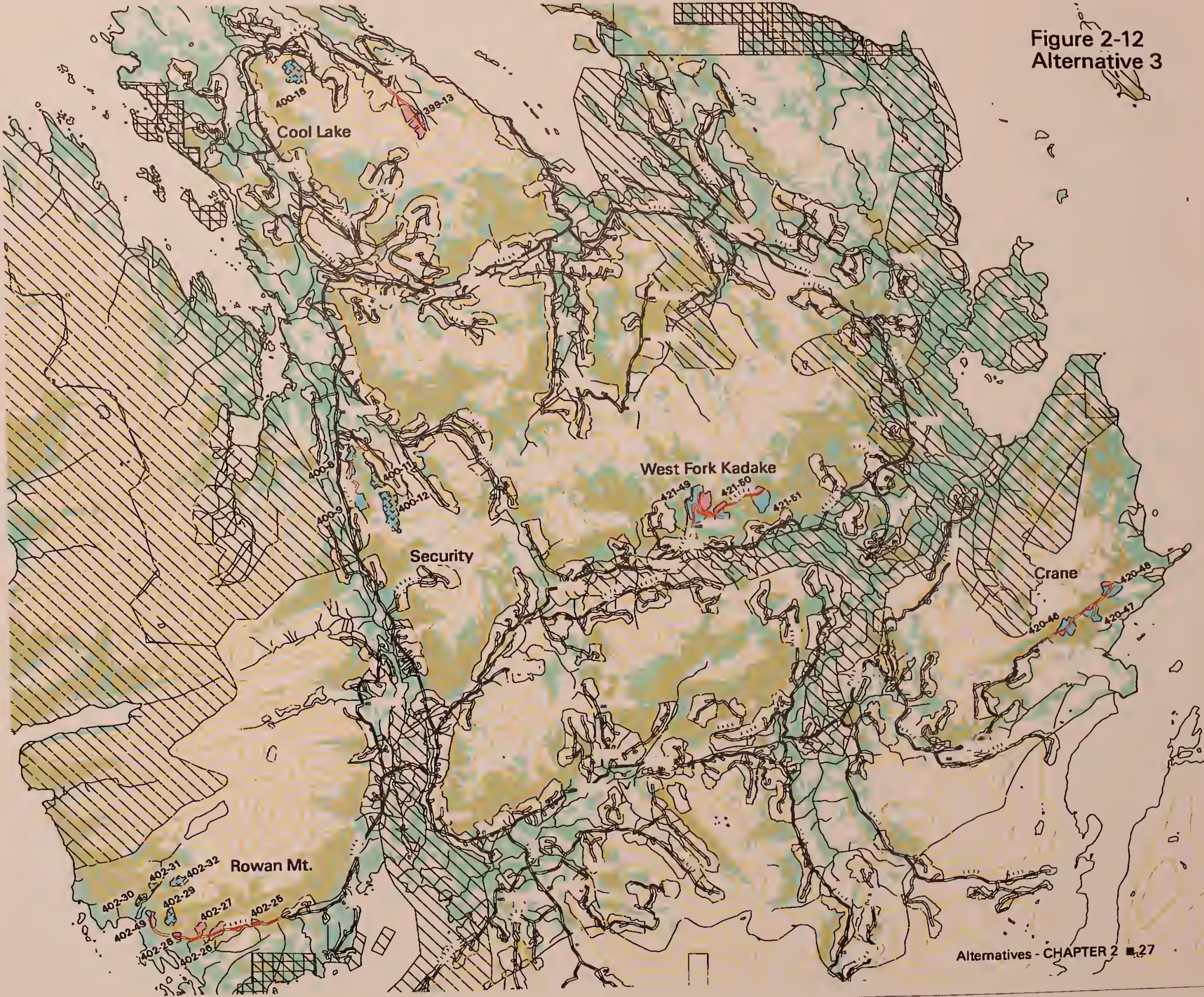


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Figure 2-12  
Alternative 3









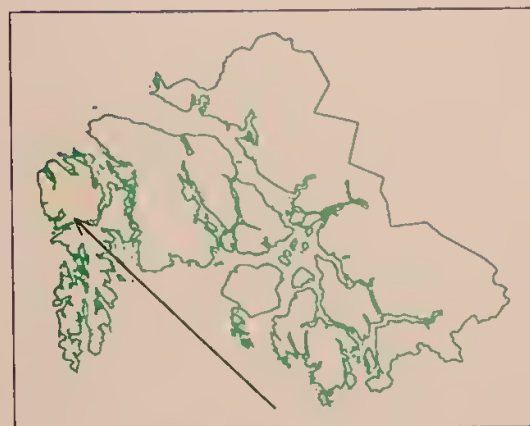
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- Existing Clearcut > 30 Yrs
- Existing/Planned Clearcut = < 30 Yrs
- Proposed Clearcut Harvest Units
- Proposed Diameter Limit Harvest Units
- Lakes and Salt Water

## FOREST WIND DISTURBANCE PROBABILITY:

- Low (Gap Phase Processes)
- Moderate (Mixed Disturbance Processes)
- High (Stand Replacement Processes)

- Non-Timber Production LWDs
- Helicopter Yarding
- Non-National Forest Lands
- Crane/Rowan Mt Project Area Boundary
- Existing or Planned System Roads
- Existing or Planned Closed Roads
- Proposed System Roads
- Proposed Temporary Roads
- 500-ft Contours



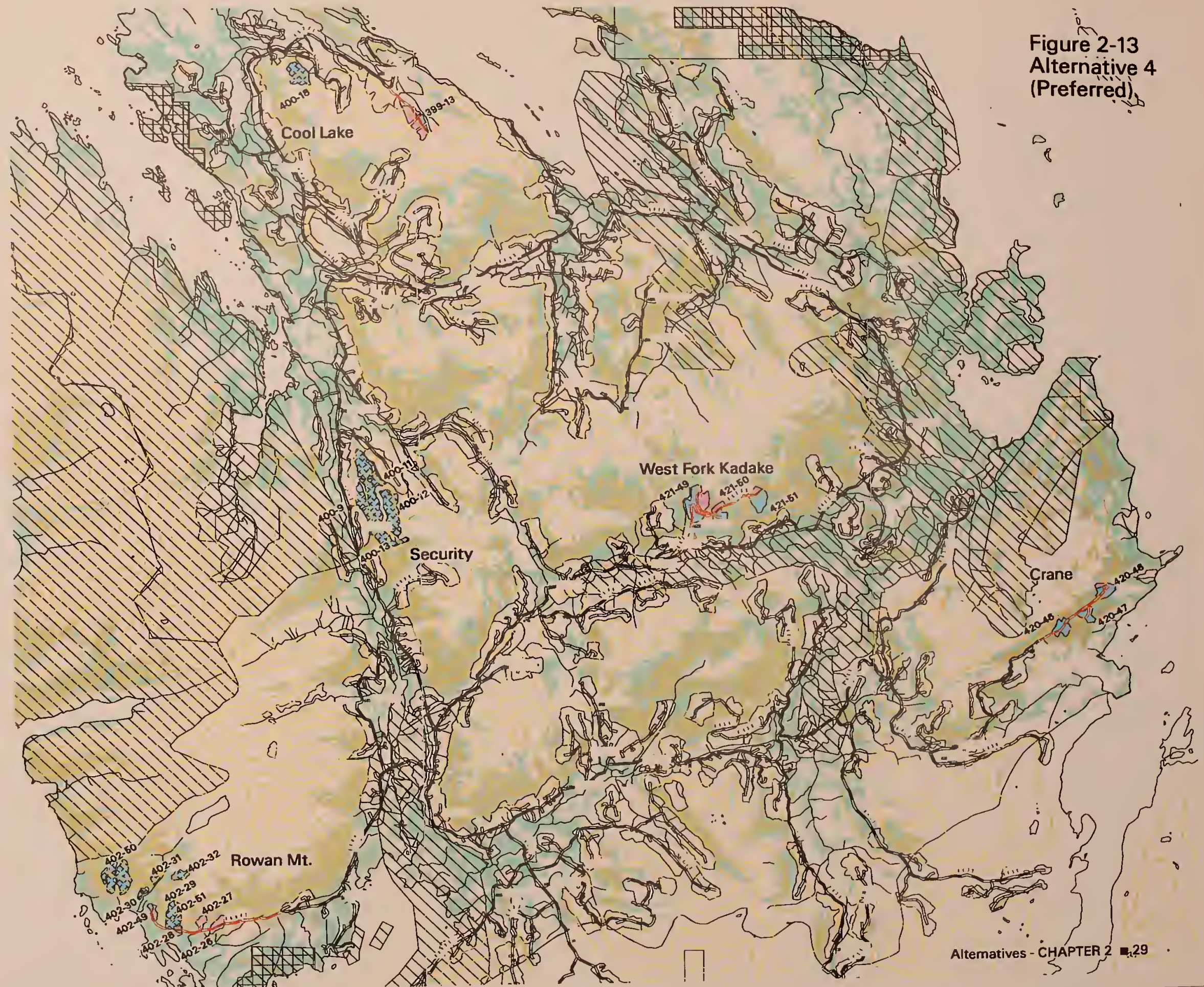
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Crane/Rowan Mountain Timber Harvest  
Draft EIS

Figure 2-13  
Alternative 4  
(Preferred)









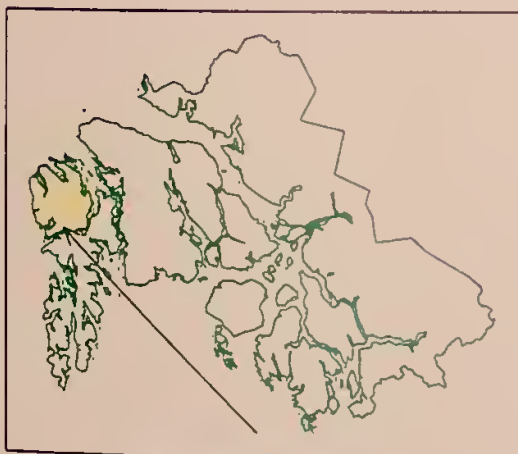
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- Existing Partial Harvest > 30 Yrs
- Existing Clearcut > 30 Yrs
- Existing/Planned Clearcut = < 30 Yrs
- Proposed Clearcut Harvest Units
- Proposed Diameter Limit Harvest Units
- Lakes and Salt Water

## FOREST WIND DISTURBANCE PROBABILITY:

- Low (Gap Phase Processes)
- Moderate (Mixed Disturbance Processes)
- High (Stand Replacement Processes)

- Non-Timber Production LUDs
- Helicopter Yarding
- Non-National Forest Lands
- Crane/Rowan Mt Project Area Boundary
- Existing or Planned System Roads
- Existing or Planned Closed Roads
- Proposed System Roads
- Proposed Temporary Roads
- 500-ft Contours



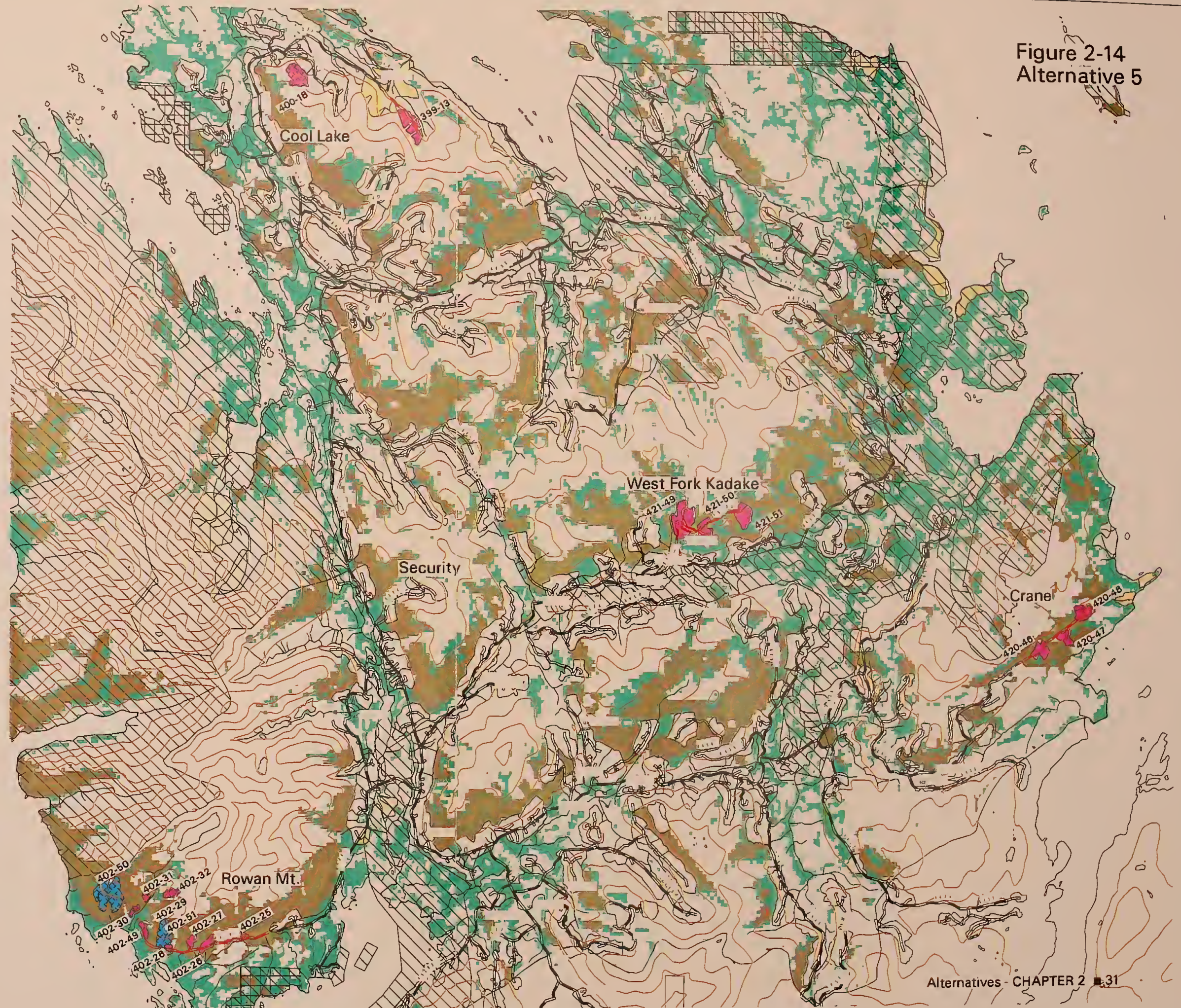
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Crane/Rowan Mountain Timber Harvest  
Draft EIS

Figure 2-14  
Alternative 5







# **Chapter 3**

## **Affected Environment and Environmental Effects**





# Chapter 3

## Setting

### Introduction

Climate, geology and disturbance agents are important factors in determining the ecological characteristics of any landscape. They determine characteristics including topography, soils, distribution of plant communities and the distribution and types of stream channels. These characteristics then influence the type and extent of resource management, whether it be for recreation, fisheries, timber production or any other resource.

Kuiu Island has a maritime climate, resulting from the moderating influence of the Pacific Ocean. In summer, this provides a cooling influence, while in winter, temperatures are warmer than would be expected for these latitudes. During the summer, temperatures are highest inland and lowest along the coast, while in winter the reverse is true. Rainfall is abundant throughout the year. There is no summer dry season. Storms with heavy rainfall and strong winds can occur year-round, but most commonly from September through November.

These infrequent but severe storms have caused massive blowdown of trees. On exposed south-facing slopes, the disturbance from windthrow has resulted in a mosaic pattern of forest stands of various ages corresponding to different storm events. Stands on more protected north aspects are most often characteristic old growth stands, where disturbance is less severe.

We divided the Crane and Rowan Mountain project area into five logical groups of units based on their location within the project area. These are the Rowan Mountain, Crane, Security, West Fork Kadake, and Cool Lake unit areas.

#### Rowan Mountain Units

The Rowan Mountain units are on the lower slope of Rowan Mountain, a steep south-facing mountain slope with a smooth, rounded alpine ecosystem. The elevation of Rowan Mountain is around 3,000 feet. Landslide tracts are a prominent part of this type of mountainslope. Muskegs and wetlands are not very common on Rowan Mountain, but can be found on the lower slope below the proposed units. Vegetation includes mountain hemlock forests on the upper slopes, western hemlock forests on the mid and lower slopes, and Sitka spruce and western hemlock/devils club forests in disturbed areas such as landslide chutes.

The proposed units are seen from Rowan Bay and Chatham Straits. The area is made up of many small watersheds with steep, bedrock streams. Fisheries downstream are limited to coho and resident trout, though some pink and chum salmon may be present a short distance up from saltwater. There are high numbers of deer and wolves as well as beaver and geese at lower elevations. There are also high numbers of marten habitat with large numbers of squirrels.

Potential for forest management is generally limited to the highly productive forest sites on the lower mountain slopes because the upper slopes are often too steep and isolated. The

proposed units consist mainly of western hemlock forests with some spruce and cedar. This slope is currently not harvested but there are some units behind the Rowan Bay camp that have been sold.

### Natural Disturbance Patterns

Landslides and windthrow are the two most common causes of natural disturbance on Rowan Mountain. Landslides originate in the very steep upper and mid-slopes and flow downslope forming long narrow features on the landscape. Landslide chutes range from unvegetated areas less than 20 years old, to alder communities, to mature spruce forest about 300 years old.

The other prominent disturbance factor in this area is windthrow. The proposed units on Rowan Mountain are on a south-facing, wind prone slope on the outer coast of Kuiu Island that is subject to frequent catastrophic wind events. Winds often come southeast to southwest up Chatham Strait and hit the face of Rowan Mountain. Wind probability mapping (Kramer, 1997.) indicates moderate to high probability of windthrow. Nearly all forest stands on this mountain slope are in the first three stages of stand development. True old-growth forests only occur on the gently sloping terrace between the bottom of the mountain and saltwater.

## Crane Units

The proposed Crane units are located on a southeast-facing slope on the West Side of Port Camden. The area consists of prominently benched hills typical of volcanic terrain. It is largely the result of glacially eroded volcanic flows. The hill slope is less than 1,500 feet in elevation. The forested slope is dominantly western hemlock and western hemlock-Alaska-cedar forest. Extensive muskegs and mixed conifer forests lie above and below the slope.

The proposed units are seen from parts of Port Camden. They are not actually in the Crane Creek watershed, but are beyond the existing harvest units in several small watersheds that flow into Port Camden. The small streams are influenced by easily erodible volcanic bedrock in the area. Fish use is limited to resident trout. There are relatively low numbers of deer, moose, wolves and bear. There is moderate marten habitat with low numbers of squirrels. Forest management activities need to proceed with due caution because of the unstable nature of the rock material.

### Natural Disturbance Patterns

Windthrow is the dominant forest disturbance agent in the vicinity of the Crane units. The area contains stands in the last three stand development stages. Winds often come from the south. Wind probability mapping (Kramer, 1997) indicates moderate to high probability of windthrow.

## Security Units

The proposed Security units are located in the Security Creek watershed at the upper end of a north-south valley that connects Rowan Bay to Security Bay. They are on well rounded ridge less than 1,500 feet in elevation. The bedrock generally weathers to a silty or loamy texture with many sharp, angular rock fragments.

Portions of the units are seen from Security Bay. The Security Creek watershed is approximately 6,000 acres in size and is currently harvested at 23%. Most of the existing units are between 15 and 25 years old. The first three miles of the main stem of Security Creek are predominantly floodplain. The watershed contains nearly 10 miles of anadromous (Class I) stream with pink, chum and coho present. There are goshawks in and near the area. There are high numbers of bears, low deer use and moderate numbers of wolves. There are beaver in the lower elevations and moderate marten habitat with a moderate number of squirrels. There are large areas of productive western hemlock forests on the ridge.

### Natural Disturbance Patterns

Windthrow is the dominant forest disturbance agent in the vicinity of the proposed Security



units. The units on the west side of the ridge are in a high to moderate wind probability zone, and the east facing units are in moderate to low probability (Kramer, 1997). Wind generated stands are common on south and west facing slopes. Old growth is dominant on north and east facing slopes and on sites topographically protected from strong storm winds. Winds generally funnel up the valley that connects Rowan and Security Bays.

### **West Fork Kadake Units**

The proposed West Fork Kadake units are located on a southfacing slope of a 1,500-foot hill in the upper west fork of Kadake Creek. The area generally consists of a long, forested hillslope. There are few muskegs in the area. The bedrock generally weathers to a silty or loamy texture with many sharp, angular rock fragments.

The proposed units are not seen from any major viewing areas. The west fork watershed is approximately 8,980 acres in size and is currently harvested at 17%. The existing units are between 8 and 27 years old. The whole Kadake Creek watershed is approximately 50 square miles in size and is currently harvested at 14%. The section of the west fork of Kadake Creek near the units is predominantly well-contained in bedrock. The main portion of Kadake Creek downstream has moderate floodplain development with some bedrock sections. The west fork of Kadake has approximately 17 miles of anadromous streams. Cohos use all of this while pink and chum-spawning habitat is limited to the lower floodplain sections. There is moderate habitat for moose and marten with a moderate number of squirrels. There is high black bear and low deer use. There are large areas of productive western hemlock forests on the slope.

#### **Natural Disturbance Patterns**

Windthrow is the dominant forest disturbance agent in the vicinity of the proposed Kadake units. Both wind generated stands and old growth stands occur on this slope. These units are in a high to moderate probability area for windthrow (Kramer, 1997). Winds are mostly from the southwest in through Rowan Bay.

### **Cool Lake Units**

The proposed Cool Lake units are located on the West Side of Saginaw Bay. They are on the smooth, northeast-facing slope of a 2,000 foot hill. The bedrock generally weathers to a silty or loamy texture with many sharp, angular rock fragments.

The proposed units are seen from Saginaw Bay. They are in two different watersheds one of, which is limited to resident trout. The other is partially in the Dean Creek watershed, which is approximately 4,700 acres in size and is currently harvested at 28%. Most of the existing units are between 9 and 32 years old. There is a fish ladder that provides access for pinks, chums and cohos. There are low numbers of deer and high numbers of bear. There are beaver at lower elevations and moderate habitat for marten and squirrels. There are large areas of productive western hemlock forests on the slope.

#### **Natural Disturbance Patterns**

Windthrow is the dominant forest disturbance agent in the vicinity of the proposed Crane units. Much of this slope is protected from wind and in an old growth condition. It lies in a low to moderate wind probability area (Kramer). However, because of the topographic position of the proposed units, they are largely wind-generated stands. Unit 400-18 is a wind-generated stand due to winds that come through the valley from Rowan to Security Bay and increase in turbulence as they wrap around the ridge. Unit 399-13 has some old growth and some wind generated areas from southeast wind.



# Habitat Conservation

## Definitions

**Biological Assessment** – A legally mandated requirement under the Endangered Species Act of 1968, to assess the affects of the Federal Action on Federally listed Threatened and Endangered Species.

**Biological Evaluation** – A legally mandated requirement under Forest Service Manual Direction to assess the affects of the Federal Action on Forest Service listed Sensitive Species.

**Biological Opinion** – A legal opinion from the US Fish and Wildlife Service or the National Marine Fisheries Service as to the affects of the listed Federal Action on Threatened and Endangered Species.

**Natural Range of Variability** – The statistical distribution of environmental conditions (e.g. density of deer over time).

**Endemic Mammals** – Restricted to a particular locality. For example, a particular species or subspecies may occur on only one or a few islands.

**Productive Old Growth (POG)** – Old growth forest capable of producing at least 20 cubic feet of wood fiber per acre per year, or having greater than 8,000 board feet per acre.

## Introduction

The Tongass National Forest provides habitat for 54 species of mammals (including the recently introduced elk on Etolin and Zarembo Islands), 231 species of birds, and five species of amphibians and reptiles. There are 18 species of marine mammals found in Southeast Alaska that depend on the ocean environment as well as upland habitat for prey species, additionally there are 45 birds and 3 amphibian or reptile species considered casual or accidental visitors to Southeast Alaska. Of these species, many are found on Kuiu Island.

There are many consumptive and non-consumptive uses for wildlife populations on Kuiu Island including sport, subsistence and commercial. Traditional life-styles and the remoteness makes the subsistence use of wildlife important to rural people in Southeast Alaska (USDA Forest Service, 1997e).

Other consumptive and non-consumptive use of wildlife also occurs. Commercial users include outfitter guides for recreational experiences such as kayaking or photography, or for hunting and fishing. Sport use is also an important activity. Federal and State agencies, chambers of commerce and schools throughout the state have educational activities built around wildlife values.

## Biological Diversity

Biological diversity within an ecosystem can be described in terms of three components: composition, structure, and function. Composition refers to the numbers and types of species, plant communities, and smaller ecosystems within an area. Structure refers to the



arrangement of these communities or ecosystems across a landscape (how they are connected). Function refers to the interactions and influences between plant and animal species within an area (how each species uses its environment) and to natural processes of change or disturbance (wind, aging, etc.).

Through the implementation of the Forest Plan Standards and Guidelines and land allocations (See Old Growth Habitat LUD pages 3-88 to 3-99, Subsistence LUD pages 4-93 to 4-94, and the Wildlife LUD pages 4-125 to 4-130) we will maintain the biological diversity within the project area. In this document we present alternatives that manage the vegetation patterns at the landscape and stand level that are, to varying degrees, consistent with natural disturbance processes (e.g. windthrow).

The old growth habitat conservation strategy in the Forest Plan resulted from response to wildlife viability issues. Due largely to uncertainty, the Forest Plan does not, however, represent a "no risk" conservation strategy; rather it represents a balance of wildlife conservation measures that consider the best available scientific information and reflects an acceptable level of risk for continued species viability.

### Reserves and Management within the Matrix.

The conservation of biological diversity requires two strategies for addressing both individual species as well as entire ecosystems (Marcot et al., 1994). The traditional species-by-species approach is important for featured Management Indicator Species (MIS), sensitive or rare species. This strategy, often called the "fine filter" approach, is discussed and implemented in the Forest Plan standards and guidelines and land allocations. Goshawk and eagle nest buffers are example of fine filter habitat considerations.

The second strategy is the coarse filter (Hunter, 1991). This approach focuses on conserving the entire ecosystem by facilitating the maintenance of a functional and interconnected natural forest mosaic.

In part, this strategy relies on a system of reserves. These reserves are blocks of intact, largely undisturbed habitats of the appropriate size, spacing, and composition to ensure the maintenance of viable, well-distributed populations. The habitat conservation area (HCA) network used for the conservation of spotted owl habitat in the Pacific Northwest is a classic example (Thomas et al., 1990). The Forest Plan used a similar strategy for maintaining habitat for biodiversity and viable wildlife populations across the Tongass. The Tongass scheme includes a system of large, medium and small old growth reserves (OGRs) which often include withdrawn areas such as wilderness, coastal beach fringe and riparian buffers for landscape connectivity, along with standards and guidelines. These OGRs are illustrated on the alternative maps.

The coarse filter approach also relies on using silvicultural practices outside the reserve system (the matrix) to provide for biodiversity, such as retaining snags and green trees within harvest units. The scientists reviewing the Forest Plan revision recommended enhancing landscape connectivity and increasing levels of leave trees within units (selection harvest techniques) and to manage human disturbance of the land similar to natural disturbance regimes (TLMP, Appendix N, p. 22, 1997).

Implicit in this matrix management approach is the use of different silvicultural systems and extended rotations (the time period between two harvests of the same unit) to achieve multiple age classes within and among managed stands (Henderson, 1993). Such practices are necessary to perpetuate the ecological structures and processes of naturally occurring mature forest (Weigand et al., 1994).

By adopting a strategy that establishes reserves and manages the matrix to maintain biodiversity, we can avoid the limitations of using either component individually (Thomas, et.

al., 1990; Franklin, 1993). As a complement to reserves, matrix management serves at least three important roles:

- Provide habitat at smaller spatial scales,
- Increase the effectiveness of the reserves, and
- Maintain landscape connectivity.

Our old growth forest habitat strategy has three primary components:

1. A network of small, medium and large old growth habitat reserves,
2. A forest-wide system of habitat protected in other non-development LUDs,
3. Forest Plan Standards and Guidelines that protect important habitat elements and provide for habitat connectivity such as beach, riparian and estuary.

The Forest Service identified and mapped small reserves in the Forest Plan to establish the Old Growth Land Use Designation areas. Small reserves serve two principal functions:

- As corridors for habitat connectivity among large and medium reserves;
- As habitat for species such as flying squirrels that are less able to disperse among larger reserves.

This timber sale is consistent with all the standards and guidelines of the Forest Plan. All alternatives meet or exceed the standards and guidelines to conserve biodiversity (form, function and composition) within the sale area.

## Wildlife Habitats

Important wildlife habitats inventoried for the Tongass Land Management Plan includes beach fringe, estuary fringe, riparian and old growth forest blocks. This inventory came from GIS computer maps. We completed ground verification in areas where questions of habitat suitability occurred.

### Alpine/Sub-Alpine

Sub-alpine habitat is the upper edge of forested areas (within 1,000 feet) adjoining alpine areas. This habitat is important summer range for deer and bears. It is also used by goshawks and wolves to hunt prey species. No alpine/sub-alpine habitat is affected in the analysis area because no timber harvest or roading occurs there, and it would be essentially unaffected by any alternative. The alpine/sub-alpine habitat on the project area is not a limiting factor to any of the MIS species.

### Beach Fringe

Beach fringe is defined as the area within 1000 feet of the mean high tide line. This transition zone receives heavy use by many species (for example: black bear; otter; mink, bald eagle; marten; black-tailed deer; Arctic and American peregrine falcons; osprey; numerous duck species and Vancouver Canada geese) during at least some of the year. No additional acres of beach fringe will be impacted in any alternative.

### Estuary Fringe

Bears, waterfowl, furbearers and eagles are all primary users of the estuarine fringe habitat. Although timber harvest activities have been minimal within the actual estuary habitat, it is

## Habitat Connectivity

## Habitat Descriptions



the timbered zone that borders estuary habitat that is evaluated here. The Forest Plan identified a 1,000-foot zone around estuarine areas for protection. The forested estuary is similar to beach fringe but due to species diversity it has a greater value to wildlife; especially black bears, river otters, peregrine falcons and waterfowl. No additional acres of estuary fringe will be impacted in any alternative.

### Forested Uplands

Forested habitat includes all areas with forest cover. Many wildlife species, including those dependent on the existing mosaic of forest types, make use these forested uplands.

We hypothesize that alternatives that maintain the naturally occurring forest mosaic minimize the effects on habitat for the deer, and most of the wildlife species living in the forests of Kuiu Island. Our challenge is to describe this natural mosaic and prescribe alternative harvest regimes that perpetuate it. This will allow us to maintain the timber industry of Southeast Alaska as well as the wildlife diversity that occur here.

Data collected indicates that catastrophic windstorms occur every 110 to 150 years in Southeast Alaska. This can range from individual trees blowing down to an entire stand (hundreds of acres). (Oliver and Larson, 1996) defined stand development stages following a catastrophic disturbance as:

1. Stand Initiation – The stand initiation stage begins after large-scale natural or human induced disturbance. The former overstory is gone and a new stand begins to grow. This stage is characterized by a wide variety of plant species and continues until new, complete tree canopy forms and begins to shade out the understory. This generally occurs in 25 –35 years (Alaback, 1982).
2. Stem Exclusion – The stem exclusion stage follows and is characterized by high tree mortality. Trees die as they get crowded out and regeneration is precluded because the thick, new canopy restricts growing space and light. There are few understory plants because of the lack of light on the forest floor. Our field observations suggest this stage lasts about 100 years on most sites.
3. Understory Reinitiation – The canopy begins to open up as trees mature and die for various reasons. As space and light become available, understory plants appear on the forest floor, and new trees establish and grow. The length of this stage varies greatly. Field data collected on Kuiu Island suggests this stand stage typically persist for 150 to 250 years with a few examples reaching 500 years or more. Depending on the frequency of major storms, many stands on exposed slopes never progress beyond this stage.
4. Old Growth<sup>6</sup> – The old growth stage appears when the stand has many small groups or individual trees of different ages (Oliver and Larson, 1996). Distinct age classes are not present. Stand structure characteristics traditionally associated with old growth exist, including large and deformed trees with heavy and craggy limbs, standing snags, multiple canopy layers, and large dead wood accumulation on the forest floor and in streams, etc. Death of one or a few overstory trees permits the growth of small patches of young trees. This process is called gap phase dynamics (Oliver and Larson, 1996). Field data suggests typical times to reach the old growth stage are 250 to 600 years.

Much of the forest on the project area does not meet the process definition of old growth.

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<sup>6</sup>The term 'old growth' has been used in many different ways. In this document, we refer to old growth as it relates to the stand development stage defined above. Others to describe esthetics, wildlife habitat, and the forest of southeast Alaska as a whole, etc have also used the term. It can also refer to stands with specific structural characteristics regardless of the processes that led to those structures (USDA Forest Service, 1992a).



Measured stand ages varied from recent (within the past year) to over 500 years. As a result of previous storms, the most common forest structure type on south-facing slopes is probably the understory reinitiation stage. The stem exclusion stage is relatively rare on the project area. Past harvest activities are still in the stand initiation stage. The old growth stage probably only occurs on about 35 percent of the forested acres of Kuiu Island (Nowacki and Kramer, 1997).

## Management Indicator Species

The Forest Plan chose several management indicator species' (MIS) to assess the health of wildlife populations on the Tongass National Forest. Some of the MIS response can be used to predict the likely response of other species with similar habitat requirements to land management activities.

We chose two MIS species for this project and another important group is also discussed. These are:

- Sitka black-tailed deer
- Marten
- Endemic terrestrial mammals.

Several other species from the Regional Forester's Sensitive Species List are discussed in the Biological Evaluation. These are the Alexander Archipelago wolf, Queen Charlotte goshawk, osprey, Peale's peregrine falcon, and the Trumpeter swan.

### Sitka Black-tailed Deer

The Sitka Black-tailed deer is an important game animal to people in Southeast Alaska. It is a prime subsistence, sport hunting and recreational viewing resource. Maintaining sufficient habitat to ensure huntable populations of this species is an objective for the Forest Service. During winters with snow accumulations, deer are generally found on southern aspects at low to moderate elevations in multi-canopied forests (forb and blueberry in the understory).

Deer populations are dynamic and respond to predation and winter weather. Deep snow accumulations make forage unavailable to deer, particularly in young growth and sparse canopy stands. Every twenty to forty years' severe winter storms kill large numbers of deer. On the Stikine Area, a series of severe deep snow winters resulted in a deer herd die-off during 1968 to 1972. It took nearly 20 years for deer numbers to recover to a sufficient level to allow hunting to resume. Between 1972 and the early 1980s it was uncommon for Forest Service personnel to see deer sign in the project area. In 1992, the population had recovered enough to allow a hunting season with a two antlered-deer tag limit.

Forest stands that are in the stand initiation or stem exclusion stages do not generally contribute to deer winter habitat when snow accumulation levels are high. As stands reach the understory reinitiation stage, around 100 years of age, cover and forage that are important for deer winter habitat begin to increase. The units that are proposed for partial harvest will more closely resemble the understory reinitiation stage and may maintain some of their value as deer winter habitat.

**Figure 3-1** Sitka Black-tailed deer in an Old Growth Forested Wetland



### Effects of Alternatives

Effects of the alternatives on habitat capability were analyzed by using the Interagency Deer Model used in the Forest Plan. The model uses elevation, aspect, amount of snow, and stand type to estimate how valuable an area is for deer winter habitat, which can be a limiting factor. Declines in deer habitat quality also affect numbers of the Alexander Archipelago wolf which preys on deer, as well as subsistence/sport hunting of deer.

For this analysis, deer winter range is determined as Productive Old Growth (POG). Table 3-1 displays the acreage harvested by harvest method, by alternative, and Table 3-2 displays the percent reduction in "Productive Old Growth" island-wide and project area-wide. Table 3-3 displays the percent of deer habitat capability remaining on the project area by the year 2030. These tables are used to evaluate the alternatives affects on deer habitat capability. Stands that receive the partial harvest prescription, where 50 percent of the overstory is retained, were estimated to retain 50 percent of their old growth habitat capability.



**Table 3-1** Effects of Proposed Harvest by Alternative on Productive Old Growth (POG) by Prescription.

	ALT 1	ALT 2		ALT 3		ALT 4		ALT 5	
Prescription	No Harvest	CC <sup>7</sup>	DL <sup>8</sup>	CC	DL	CC	DL	CC	DL
Acres of POG Harvested by Alternative		738 ac	0 ac	210 ac	528ac	159ac	897ac	548 ac	164a
Percent By Harvest Prescription		100%	0	28%	72%	15%	85%	77%	23

**Table 3-2** Amount POG remaining by Alternative on Island-wide and Project Area scale.

	Percent POG Currently Available	Percent POG Remaining After Harvest In Alternative 2	Percent POG Remaining After Harvest In Alternative 3	Percent POG Remaining After Harvest In Alternative 4	Percent POG Remaining After Harvest In Alternative 5
Percent Remaining POG <sup>9</sup> – Island-wide	92.69%	92.46%	92.54%	92.50%	92.49%
Percent Remaining POG <sup>10</sup> – Project area	83.51%	82.88%	83.10%	82.99%	82.97%

<sup>7</sup> Clear Cut prescription leaving 10% overstory in each unit.<sup>8</sup> Diameter Limit prescription leaving 50% overstory in each unit.<sup>9</sup> Island-wide POG = 326,318 acres based on 1954 values.<sup>10</sup> Project area POG = 117,750 acres based on 1954 values.



## Effects on Sitka Black-tail Deer Habitat

**Table 3-3** Deer habitat capability in 1954, 1995 and 2030 by alternative.

Habitat capability in 1954	Habitat capability in 1997	Habitat capability by year 2030				
		Alt1	Alt2	Alt3	Alt4	Alt5
100%	82%	81%	80%	80%	80%	80%

### Alternative 1

Alternative 1 will analyze the effects of having no timber sale or road construction in the Crane and Rowan Mountain project area. This alternative is provided so that you can see the changes that the other alternatives have on the social, physical and biological environment. This alternative is the most responsive to maintaining current wildlife habitat. It would not contribute to local employment or income and would not move the project area toward the desired future condition that is stated in the Forest Plan (TLMP, 1997).

Deer habitat capability will decline in all alternatives. The Interagency Deer Model predicts that habitat values will decline another one-percent from existing levels. This decline is primarily due to the managed stands presently in the stand initiation stage moving into the stem exclusion stage. Cumulatively, the project area is expected to have 55 percent of the habitat remaining at year 2095 according to the Forest Plan.

### Alternative 2

Alternative 2 is the proposed action that would harvest approximately 23 MMBF of timber. It would offer the second most volume to potential large and small operators and provides the best economic return of all the alternatives. All of this harvest would be clear cut<sup>11</sup> and would use cable or helicopter yarding. Approximately 6.59 miles of specified road and 2.4 miles of temporary road would be constructed to access some of this timber and provide infrastructure for future sales. All new roads would be closed following harvest to protect wildlife values. This and all other action alternatives will use the existing Rowan Bay LTF for log barging. This alternative serves as the basis of comparison for all other alternatives.

728 acres will be harvested by clear cut methods. The deer model predicts that 80 percent of the habitat will be remaining by year 2030. Cumulatively, this alternative design will meet the Forest Plan estimate of 55 percent of the habitat remaining in WAA 5012 by the year 2095.

### Alternative 3

Alternative 3 responds primarily to public concerns surrounding wildlife habitat, scenery and watershed resources. Harvesting some units as partial cuts rather than clear cuts would reduce habitat fragmentation, watershed and visual impacts. This alternative would harvest approximately 17 MMBF of timber. Approximately 6.59 miles of specified road and 2.4 miles of temporary road would be constructed to access some of this timber and provide infrastructure for future sales. All new roads would be closed following harvest to protect wildlife values. This and all other action alternatives will use the existing Rowan Bay LTF for log barging.

<sup>11</sup> Clear cutting is an even-aged silvicultural system used to manage forest lands. All clear cut systems planned in this project will include retention of wildlife legacy trees.

diameter limit cut to maintain the naturally occurring disturbance patterns. This alternative will have 80% of the habitat remaining in the year 2030. The diameter limit resembles the understory reinitiation stage and therefore helps maintain the value of the winter habitat. We predict that this harvest scheme will retain at least 50 percent more of the habitat than the Forest Plan prediction of 55% by the year 2095.

#### Alternative 4

Alternative 4 responds to the timber economics, wildlife habitat and fragmentation, scenery and watershed issues. Alternative 4 comprises all of the units in Alternative 2 except for two. One clear cut unit in the Security Creek watershed is dropped to lower the risk to watershed resources. On Rowan Mountain, one clear cut unit is dropped and other partial harvest units enlarged or added to better maintain natural disturbance patterns. Approximately 24 MMBF will be harvested by this alternative, 6.59 miles of specified road and 1.4 miles of temporary road would be constructed to access some of this timber and provide infrastructure for future sales. All new roads would be closed following harvest to protect wildlife values. This and all other action alternatives will use the existing Rowan Bay LTF for log barging.

Alternative 4 harvests 1056 acres and converts the most acres by clear cutting 159 acres and by cutting 897 acres using diameter limit. This alternative will have 80 percent of the habitat remaining at year 2030 and we expect this alternative scheme, even though it harvests more acres, to reduce the expected Forest Plan harvest level by 50% below the 55 percent prediction in the year 2095.

#### Alternative 5

Alternative 5 responds primarily to public concerns surrounding watershed resources and timber economics. This alternative drops all harvest units from the Security Creek watershed in order to lower the risk to the watershed resources. Dropping these units would also decrease fragmentation and impacts to the visual resource in this watershed. This alternative then uses all the other clear cut units from Alternative 2 and adds units 402-50 and 402-51 on Rowan Mountain to provide more timber volume. This alternative would harvest approximately 21 MMBF of timber. Approximately 6.59 miles of specified road and 1.5 miles of temporary road would be constructed to access some of this timber and provide infrastructure for future sales. All new roads would be closed following harvest to protect wildlife values. This and all other action alternatives will use the existing Rowan Bay LTF for log barging.

This alternative will have similar effects as Alternative 2 by harvesting 712 acres. All units in the Security Creek watershed are dropped, while several partial harvest units in the Rowan Mountain area are added. The Interagency deer model predicts that 80% of the habitat will be remaining in the year 2030. We expect the predicted 55 percent remaining habitat from the Forest Plan to be accomplished using this alternative scheme.

## Marten

Extensive mature forests are the mainstay of marten populations in the Pacific northwest states. These habitats provide many den sites and an abundant prey base for martens (Suring et. al., 1988); (Meslow et. al., 1981). Marten are members of the weasel family that depend on mature forests with snags and downed logs for denning and prey habitat. Beach fringe and riparian areas (Soutiere, 1979), are important for these animals. They can be sensitive to over-exploitation by trapping.

Snags provide important den sites to martens for resting activities in both winter and summer (Spencer, 1987). They use the tops of broken snags as resting sites in the summer and cavities in summer and winter. They prefer snags that range from 14 to 49-inch diameter at breast height (dbh.) (Campbell, 1979; Simon, 1980; Spencer, 1987). Marten are non-social carnivores that maintain large home ranges (Powell, 1994). The species is native to Kupreanof, Mitkof and Kuiu islands, but was introduced to other Southeast Alaskan islands (Flynn, 1992). The limited natural distribution of marten in the archipelago indicates a



carnivores that maintain large home ranges (Powell, 1994). The species is native to Kupreanof, Mitkof and Kuiu islands, but was introduced to other Southeast Alaskan islands (Flynn, 1992). The limited natural distribution of marten in the archipelago indicates a limited dispersal potential due to natural water barriers (Flynn, 1992). These barriers may not occur among Mitkof, Kupreanof and Kuiu Islands.

Marten viability has been provided for on Kuiu Island. All alternatives meet the Forest Plan Standards and Guidelines. Alternatives 3, 4, and 5 will exceed the Forest Plan Standards and Guidelines by using the partial harvest.

**Figure 3-2** Marten captured on Mitkof Island during the radio telemetry study



### Endemic Terrestrial Mammals

Forest Plan standards and guidelines for endemic terrestrial mammals require surveys on islands smaller than 50,000 acres in size. Kuiu Island is approximately 500,000 acres in size. No terrestrial mammals are known to be endemic only to Kuiu Island.

There are currently populations of flying squirrels on Mitkof Island, and probably Kupreanof Island (Kim Hastings, pers. comm.). It is not known whether the flying squirrel exists on Kuiu, but no sightings have been reported.



**Figure 3-3** Ermine captured on Mitkof Island during the radio telemetry study



Endemic terrestrial mammals were also a topic of discussion at the consultation meeting held October 10, 1997 with the interagency implementation team consisting of NMFS, USF&WS, EPA, ADGC, ADEC, and ADF&G (Transition meeting, 1997). No concerns relative to this project regarding endemic terrestrial mammals were noted.

## Consistency of Alternatives in Relation to Disturbance Ecology

We have found that for productive western hemlock and western hemlock/Sitka spruce stands, the progression to the old growth stage usually takes place in wind sheltered areas. These occur mostly on north facing slopes of the project area, since the strongest winds come from the south. In contrast, stands occurring on wind-exposed landscapes seldom reach old growth as storm intervals seem to be frequent enough to restrict forests to the first three stages of development (Kramer, 1997).

On these wind-exposed landscapes, a variety of successional pathways exist (Nowacki and Kramer, 1997). A common progression starts with a partial disturbance. Over time, the stand moves into the understory reinitiation stage. In this stage two distinct age classes are present in the overstory: the individuals left after the stand initiating storm; and the trees that started growing right after the storm. Additionally, there is a third age class beginning to develop in the understory. At this point due to the frequency of major storms, the stand is partially disturbed again. If all the oldest trees blow over, the stand continues to develop with two age classes. If not, the stand structure becomes more complex, now containing three age classes.

blows over in major storm events.

We propose to mimic natural disturbance on two levels: the stand level and the landscape level. At the stand level, we will mimic the pattern of repeated partial disturbance as described above by creating harvest units with two or three age classes of trees. These units will closely resemble the understory reinitiation stage following partial disturbance. In addition, we will mimic the complete stand-replacing event by creating units with few trees left, moving them into the stand initiation stage. At the landscape level, we will maintain the natural patchy pattern of stands existing after windthrow events that leave some stands completely blown down while other nearby stands are only partially blown over. We propose to do this by intermixing units that closely resemble the understory reinitiation stage right after harvest with units that are moved into the stand initiation stage.

The tools that are available for use in maintaining natural disturbance processes at the stand level are discussed in the Forest Plan (Appendix G). This appendix lists three groupings of silvicultural systems (ways of managing forests for clearly defined goals (Smith, 1962)). They are even-aged, two-aged and uneven-aged systems. The silvicultural system applied to each proposed unit is listed on the individual unit cards found in Appendix B of this document. There is also a discussion of which stand development stage the unit is currently in, the desired future condition of the unit, and whether the unit is expected to in an even-aged, two-aged or uneven-aged condition over time.

### Reserve Trees

Another important habitat components of the forest are snags for cavity nesting birds and mammals. The clear-cut system will retain 10 percent of the overstory trees, the two-aged management system will retain between 50 and 60 percent of the overstory trees in the unit. These trees will provide biological legacies and large woody debris for future stands.

Table 2-1 displays the amount of harvest in each unit by alternative. We are prescribing different harvest strategies in each alternative. Recent cruise data from the project areas shows that the diameter limit will retain approximately 50 to 60 percent of the overstory canopy. This will range from as little as 30 percent to as much as 80 percent remaining canopy due to the natural pattern found in our forest types. In addition, we will retain one larger spruce tree every 10 acres as a food source for the red squirrel and to insure a biological legacy.

Alternatives 3 and 4 will maintain legacy trees in units through the prescriptive measures described on the unit cards. Alternative 2 and 5 will maintain buffers of trees for snag recruitment along streamcourses and unit boundaries as well as the non-merchandisable trees left standing within the unit.

## Effects of Alternatives by Area

The information and data included in the previous sections provide the basis for evaluating effects of the proposed alternatives on wildlife habitat and species distribution. Effects are projected not only for the duration of this project, but for the reasonable foreseeable future. The analysis is conducted on three spatially different levels for a better understanding and comparison. These levels are:

- The Stand Level
- The Sale Area Level
- The Island Wide or Ecosystem Level.

- The Island Wide or Ecosystem Level.

## Cool Lake Units

The proposed Cool Lake units are located on the West Side of Saginaw Bay. They are on the smooth, northeast-facing slope of a 2,000 foot hill. At the "Stand Level" both are connected to the Medium Old Growth Reserve in VCU 401 and to the Small Old Growth Reserve located in the Straight Creek by the Riparian Stream corridors and the Beach Fringe. At the "Sale Area Level" they connect through the Beach Fringe, Riparian Stream and Kadake Creek Wild and Scenic River corridors to the Medium Old Growth Reserve at Kadake Creek. They connect through the Medium Old Growth Reserves in VCUs 401 and 420 to the other Small Old Growth Reserves in VCUs 402 and 419. This, in turn, ties into the Large Old Growth Reserve in the Tebenkof Wilderness Area and thus to the remainder of the island. See the enclosed map for better details and ideas of wildlife movement patterns.

The U.S. Fish and Wildlife Service has expressed concern about the connectivity of the Old Growth Reserve (OGR) in VCU 399 (Transition meeting, 1997). This particular reserve meets the design criteria for OGRs but because of the geologic character of the area (high elevation), it does not readily connect to the southern VCUs. There is one pass over the mountains to the south that is 1000 feet in elevation, another passage along the beach via the beach fringe and a third along the stream corridor to the east. All three will be maintained for the duration of these sales and will not be impacted. We do not plan further units in these areas for the foreseeable future. All new roads constructed will be closed following harvest activities to protect wildlife values.

**Table 3-4 Summarized effects of Cool Lake Units by Alternative**

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
Landscape Design	NC <sup>12</sup>	CC=93ac DL=0ac	CC=79ac DL=14ac	CC=50ac CL=14ac	CC=64ac DL=0ac
Within Stand Structure	NC	CC=93ac 10% retained in unit. DL=0ac	CC=79ac 10% retained in unit. DL=14 ac 50% retained in unit.	CC=50ac 10% retained in unit. DL=14ac 50% retained in unit.	CC=64ac 10% retained in unit. DL=0ac
Wildlife Corridors	NC	Maintained OGR connectivity to VCU 399	Maintained OGR connectivity to VCU 399	Maintained OGR connectivity to VCU 399	Maintained OGR connectivity to VCU 399
Road Objectives	NC	3.14 miles of roads closed for wildlife value	3.14 miles of roads closed for wildlife value	3.14 miles of roads closed for wildlife value	3.14 miles of roads closed for wildlife value

The proposed units are in two different watersheds. One unit is in the 4,700 acres Dean Creek

<sup>12</sup> NC means No Cut – Unit is not harvested in this Alternative.



watershed that is currently harvested at 28%. Most of the existing units are between 9 and 32 years old. Pellet transects run by the Forest Service in conjunction with the Alaska Department of Fish and Game show low deer populations in the Security Bay area. Black bear populations are high in the Dean Creek, Security Bay area. There are high beaver populations at lower elevations with moderate habitat for marten and red squirrels. There are large areas of productive western hemlock forests on the slope.

### Natural Disturbance Patterns

Windthrow is the dominant forest disturbance agent in the vicinity of the proposed units. Much of this slope is protected from wind and in an old growth condition. It lies in a low to moderate wind probability area (Kramer, 1997). However, because of the topographic position of the proposed units, they are largely wind-generated stands. Unit 400-18 is a wind-generated stand due to winds that come through the valley from Rowan to Security Bay and increase in turbulence as they wrap around the ridge. Unit 399-13 has some old growth and some wind generated areas from southeast wind.

### Action Alternatives:

Both units are treated the same. In Alternatives 2 and 5 the clear cut prescription is used and 10 percent of the overstory will be retained. Alternatives 3 and 4 use the diameter limit cut that remove 50 percent of the canopy cover.

### Security Units

The proposed Security units are on well-rounded ridge less than 1,500 feet in elevation. At the "Stand Level" all are connected to the Medium Old Growth Reserve in VCU 401 through the Wild and Scenic River corridor at Fall Dog Creek and the Beach Fringe. At the "Sale Area Level" they connect through the Beach Fringe, Riparian Stream and the Small Old Growth Reserve at Rowan Creek. They connect through this Small Old Growth Reserve in VCUs 402 and the Medium Old Growth Reserve in VCU 403 which ties into the Large Old Growth Reserve in the Tebenkof Wilderness Area and thus to the remainder of the island. See the enclosed map for better details and ideas of wildlife movement patterns.

**Table 3-5 Summarized effects of Security Units by Alternative**

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
Landscape Design	NC	CC=197ac DL=0ac	CC=0ac DL=197ac	CC=0ac DL=425ac	CC=59ac DL=0ac
Within Stand Structure	NC	CC=197ac 10% retained in unit. DL=0ac	CC=0ac DL=197ac 50% retained in unit.	CC=0ac DL=425ac 50% retained in unit.	CC=59ac 10% retained in unit. DL=0ac
Wildlife Corridors	NC	Maintained corridor to medium OGR and pass to Rowan Bay	Maintained corridor to medium OGR and pass to Rowan Bay	Maintained corridor to medium OGR and pass to Rowan Bay	Maintained corridor to medium OGR and pass to Rowan Bay
Road Objectives	NC	1.96 miles of roads closed for wildlife	1.96 miles of roads closed for wildlife	1.03 miles of roads closed for wildlife	1.03 miles of roads closed for wildlife

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
		value.	value.	value.	value.

The Security Creek watershed is approximately 6,000 acres in size and is currently harvested at 23%. Most of the existing units are between 15 and 25 years old. In Security Bay there are high numbers of bears, low deer use and a moderate numbers of wolves. There are numerous beaver dams in Dean Creek and at lower elevations. Marten habitat is moderate with a moderate number of red squirrels for a food source for marten and goshawks. A goshawk nest site is just to the south of this area. The nest has been abandoned for two years but goshawks were noted in the vicinity this year, however, no nest site was located. Another pair, which moved from Prince of Wales Island, has built a nest on the western shore of Security Bay in the medium OGR. There are large areas of productive western hemlock forests on the ridge. All new roads constructed will be closed following harvest activities to protect wildlife values.

#### **Natural Disturbance Patterns**

Windthrow is the dominant forest disturbance agent in the vicinity of the proposed Security units. The units on the west side of the ridge are in a high to moderate wind probability zone, and the east facing units are in moderate to low probability (Kramer, 1997.) Wind generated stands are common on south and west facing slopes. Old growth is dominant on north and east facing slopes and on sites topographically protected from strong storm winds. Winds generally funnel up the valley that connects Rowan and Security Bays. Some of the areas within the proposed units are old growth in nature, the diameter limit should allow the areas to return to an uneven-aged character as individual trees blow over in the future. This area should return to a condition similar to what is currently there by the end of the rotation.

#### **Alternative 2:**

Unit 400-22 is not harvested in this alternative; all other units are harvest using an even-aged system.

#### **Alternatives 3:**

Alternative 3 cuts 29 acres in unit 400-8 using an even-aged harvest system. Unit 400-13 is not harvested in this alternative. Unit 400-9 cuts 33 acres, 400-11 removes 26 acres, 400-12 harvests 79 acres and 400-18 cuts 59 acres using the diameter limit prescription that retains 50 percent of the tree crown cover.

#### **Alternative 4:**

All units' are harvested using the diameter limit that retains 50 percent of the tree crown cover. Unit 400-8 is not harvested, unit 400-9 removes 33 acres, 400-11 cuts 26 acres, 400-12 harvests 79 acres and 400-22 cuts 228 acres. Each of these units will retain from 50 to 60 percent of the overstory vegetation following harvest.

#### **Alternative 5:**

Only unit 400-18 is cut in this alternative using an even-aged harvest system to remove 59 acres.

## **Rowan Mountain Units**

The Rowan Mountain units are on the lower slope of Rowan Mountain, a steep south-facing mountain slope with a smooth, rounded alpine ecosystem. The elevation of Rowan Mountain is around 3,000 feet. Landslide tracts are a prominent part of this type of mountainslope. Muskegs and wetlands are not very common on Rowan Mountain, but can be found on the lower slope below the proposed units. Vegetation includes mountain hemlock forests on the upper slopes, western hemlock forests on the mid and lower slopes, and Sitka spruce and



western hemlock/devils club forests in landslide chutes. At the "Stand Level" all are connected to the Medium Old Growth Reserve in VCU 401 through the alpine and the Beach Fringe. At the "Sale Area Level" they connect through the Beach Fringe, Riparian Stream and the Small Old Growth Reserve at Rowan Creek. They connect through this Small Old Growth Reserve in VCUs 402 and the Medium Old Growth Reserve in VCU 403 which ties into the Large Old Growth Reserve in the Tebenkof Wilderness Area and thus to the remainder of the island. See figure 3-4 for details on wildlife habitat connectivity.

**Table 3-6 Summarized effects of Rowan Mountain Units by Alternative**

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
Landscape Design	NC	CC=148ac DL=0ac	CC=69ac DL=79ac	CC=37ac CL=220ac	CC=148ac DL=141ac
Within Stand Structure	NC	CC=148ac 10% retained in unit. DL=0ac	CC=69ac 10% retained in unit. DL=79ac 50% retained in unit.	CC=37ac 10% retained in unit. DL=220ac 50% retained in unit.	CC=148 ac 10% retained in unit. DL=141ac 50% retained in unit.
Wildlife Corridors	NC	Maintain beach/alpine habitat corridors.	Maintain beach/alpine habitat corridors.	Maintain beach/alpine habitat corridors.	Maintain beach/alpine habitat corridors.
Road Objectives	NC	2.48 miles of roads closed for wildlife value.	2.48 miles of roads closed for wildlife value.	2.4 miles of roads closed for wildlife value.	2.48 miles of roads closed for wildlife value.

The proposed units are in small watersheds with steep, bedrock streams. There are high numbers of deer and wolves over the entire face of Rowan Mountain. Deer populations were retained in this area even during the die-off of the early 1970s. A wolf den area was located as well as beaver and geese at lower elevations. There is also high marten habitat with large numbers of red squirrels. Sea otters have been seen in Rowan Bay along with river otters.

Potential for forest management is generally limited to the highly productive forest sites on the lower mountainslopes because the upper slopes are often too steep and isolated. The proposed units consist mainly of western hemlock forests with some spruce and cedar. This slope is currently not harvested but there are some units behind the Rowan Bay camp that have been sold. All new roads constructed in this operation will be closed following the harvest activities to protect the wildlife populations on this portion of Rowan Mountain.

### Natural Disturbance Patterns

Landslides and windthrow are the two most common causes of natural disturbance on Rowan Mountain. Landslides originate in the very steep upper and mid-slopes and flow downslope forming long narrow features on the landscape. Landslide chutes range from unvegetated areas less than 20 years old, to alder communities, to mature spruce forest about 300 years old.



The other prominent disturbance factor in this area is windthrow. The proposed units on Rowan Mountain are on a south-facing, wind prone slope on the outer coast of Kuiu Island that is subject to frequent catastrophic wind events. Winds often come southeast to southwest up Chatham Strait and hit the face of Rowan Mountain. Wind probability mapping (Kramer, 1997.) indicates moderate to high probability of windthrow. Nearly all forest stands on this mountainslope are in the first three stages of stand development. True old-growth forests only occur on the gently sloping terrace between the bottom of the mountain and saltwater.

**Alternatives 2 and 5:**

With the exception of Units 402-50 and 51 in Alternative 5, which remove 106 and 35 acres using the diameter limit respectively, all units are harvested using the even-aged prescription.

**Alternatives 3:**

The uphill portions of units 402-25 26, 27, 28 and the eastern section of unit 49 harvests 22, 17, 16.4 and 10 acres using an even-aged system. All other portions of these units harvest 0, 8, 0, 3 and 5 acres using the diameter limit which will maintain between 50 and 60 percent of the existing overstory following harvest.

**Alternative 4:**

Unit 402-25 is not harvested under this alternative. The uphill portion of units 26, 27, 28 and the eastern portion of unit 49 will remove 17, 16, 4 and 10 acres using an even-aged system. All other portions of these units will remove 8, 0, 3, and 5 acres using the two-aged diameter limit system described above. Units 402-30, 31, 32, 50 and 51 are added in this alternative and will be harvested 10, 8, 22, 106 and 35 acres using the two-aged system.

## **Crane Creek Units**

The proposed Crane units are located on a southeast-facing slope on the West Side of Port Camden. The hill slope is less than 1,500 feet in elevation. The forested slope is dominantly western hemlock and western hemlock/Alaska yellow cedar forest. Extensive muskegs and mixed conifer forests lie above and below the slope. At the "Stand Level" all are connected to the Small Old Growth Reserve in VCU 399 through the Wild and Scenic River corridor in Kadake Creek, alpine, riparian buffers and the Beach Fringe. At the "Sale Area Level" they connect through the Beach Fringe, Riparian Stream and the Small Old Growth Reserve in VCUs 420 and 421. They connect through these Small Old Growth Reserves to the Medium Old Growth Reserve in VCU 403 and into the Large Old Growth Reserve in the Tebenkof Wilderness Area and thus to the remainder of the island. See the enclosed map for better details and ideas of wildlife movement patterns.

**Table 3-7 Summarized effects of Crane Creek Units by Alternative**

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
Landscape Design	NC	CC=107ac DL=0ac	CC=8ac DL=99ac	CC=8ac CL=99ac	CC=107ac DL=0ac
Within Stand Structure	NC	CC=107ac 10% retained in unit.  DL=0ac	CC=8ac 10% retained in unit.  DL=99ac 50% retained in unit.	CC=8ac 10% retained in unit.  DL=99ac 50% retained in unit.	CC=107ac 10% retained in unit.  DL=0ac
Wildlife Corridors	NC	Maintained corridors between beach/alpine habitat.	Maintained corridors between beach/alpine habitat.	Maintained corridors between beach/alpine habitat.	Maintained corridors between beach/alpine habitat.
Road Objectives	NC	2.66 miles of roads closed for wildlife value.	2.66 miles of roads closed for wildlife value.	2.66 miles of roads closed for wildlife value.	2.66 miles of roads closed for wildlife value.

The proposed units are not actually in the Crane Creek watershed, but are beyond the existing harvest units in several small watersheds that flow into Port Camden. The small streams are influenced by easily erodible volcanic bedrock in the area. Prior to the 1970s die-off of the deer population on Kuiu Island, high numbers of deer lived in the Rocky Pass area and Crane Creek area has a similar habitat value. There are relatively low numbers of deer, moose, wolves and bear in the area. There is moderate marten habitat with low numbers of red squirrels. All new roads constructed in this operation will be closed following the harvest activities to protect the wildlife populations.

## Natural Disturbance Patterns

Windthrow is the dominant forest disturbance agent in the vicinity of the Crane units. The area contains stands in the last three stand development stages. Winds often come from the south. Wind probability mapping (Kramer, 1997.) indicates moderate to high probability of windthrow.

### Alternatives 2 and 5:

Unit's 420- 46, 47 and 48 will harvest 38, 27, and 42 acres using the clear cut silvicultural method. All clear cut units will have approximately 10 percent reserve trees remaining after harvest.

### Alternatives 3:

The northern portion of 420-48 will harvest 8 using an even-aged system, units 46 and 47 will harvest 38 and 27 acres using the two-aged system.

### Alternatives 4:

The northern portion of 420-48 will harvest 8 using an even-aged system, units 46 and 47 will harvest 38 and 27 acres using the two-aged system.

**West Fork Kadake Units**

The proposed West Fork Kadake units are located on a south-facing slope of a 1,500-foot hill in the upper west fork of Kadake Creek. The area generally consists of a long, forested hillslope. There are few muskegs in the area. The bedrock generally weathers to a silty or loamy texture with many sharp, angular rock fragments. At the “Stand Level” all are connected to the Small Old Growth Reserve in VCU 399 through the Wild and Scenic River corridor in Kadake Creek, alpine, riparian buffers and the Beach Fringe. At the “Sale Area Level” they connect through the Beach Fringe, Riparian Stream and the Small Old Growth Reserve in VCUs 420 and 421. They connect through these Small Old Growth Reserves to the Medium Old Growth Reserve in VCU 403 and into the Large Old Growth Reserve in the Tebenkof Wilderness Area and thus to the remainder of the island. See the enclosed map for better details and ideas of wildlife movement patterns.

**Table 3-8 Summarized effects of West Fork Kadake Units by Alternative**

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
Landscape Design	NC	CC=193ac DL=0ac	CC=54ac DL=139ac	CC=54ac DL=139ac	CC=193ac DL=0ac
Within Stand Structure	NC	CC=193ac 10% retained in unit.  DL=0ac	CC=54ac 10% retained in unit.  DL=139ac 50% retained in unit.	CC=54ac 10% retained in unit.  DL=139ac 50% retained in unit.	CC=193ac 10% retained in unit.  DL=0ac
Wildlife Corridors	NC	Maintain corridors between alpine and stream habitat.	Maintain corridors between alpine and stream habitat.	Maintain corridors between alpine and stream habitat.	Maintain corridors between alpine and stream habitat.
Road Objectives	NC	2.83 miles of roads closed for wildlife value.	2.83 miles of roads closed for wildlife value.	2.83 miles of roads closed for wildlife value.	2.83 miles of roads closed for wildlife value.

The west fork watershed is approximately 8,980 acres in size and is currently harvested at 17%. The existing units are between 8 and 27 years old. The whole Kadake Creek watershed is approximately 50 square miles in size and is currently harvested at 14 percent. The section of the west fork of Kadake Creek near the units is predominantly well-contained in bedrock. The main portion of Kadake Creek downstream has moderate floodplain development with some bedrock sections. There is moderate habitat for moose, marten and red squirrels. Beaver populations are stable and relatively high. There is high black bear use. Moose populations are on the increase in the Kadake watershed but deer are still very low in numbers. There are large areas of productive western hemlock forests on the slope. All new roads constructed in this operation will be closed following the harvest activities to protect the wildlife populations on this portion of Rowan Mountain.



### Natural Disturbance Patterns

Windthrow is the dominant forest disturbance agent in the vicinity of the proposed Kadake units. Both wind-generated and old growth stands occur on this slope. These units are in a high to moderate probability area for windthrow (Kramer, 1997). Winds are mostly from the southwest through the Rowan Bay drainage.

#### Alternatives 2 and 5:

Units 421-49 will harvest 97 acres, 50 cuts 39 acres and 51 removes 57 acres using even-aged harvest systems.

#### Alternatives 3 and 4:

The eastern portion of unit 421-49 cuts 29 acres and the northern (uphill) portions of units 50 and 51 cut 12 and 13 acres using the clear cut prescription (retaining 10 percent Reserve Trees). The remaining portions of these units harvest 68, 27 and 44 acres using the diameter limit (retaining approximately 50 percent of the overstory trees).

### Other Species of Concern

#### Marbled Murrelet

The marbled murrelet is a robin-sized seabird found throughout the North Pacific. It feeds in near-shore ocean areas, inland saltwater and occasionally on inland freshwater lakes. The bird feeds below the waters' surface on small fish and invertebrates.

The marbled murrelet is a Forest Service Sensitive Species in Alaska. The U. S. Fish and Wildlife Service no longer lists category 2 species under the Endangered Species Act. Established marbled murrelet habitat requirements' for Southeast Alaska are unknown. There is a need for research on murrelet nesting and foraging habitat requirements, and factors such as oil spills, fishing nets, mortality and predation. State and federal agencies in Alaska are currently gathering the baseline ecological data for this species. Marbled murrelets occur in the waters around the analysis area.

#### Northern Goshawk

The goshawk is a raven sized raptor associated with forests having tall dense canopies. These features allow goshawks to hunt beneath the canopy. Goshawks typically forage over ten thousand acres in s. e. Alaska. Recent information shows the Queen Charlotte Goshawk uses many different landscape features (Iverson, 1997).

The Fish and Wildlife Service considered the goshawk for federal listing as endangered under the Endangered Species Act in 1995 and again in 1997. The Forest Service, Fish and Wildlife Service and Alaska Department of Fish and Game have signed an agreement to conserve species of concern. These three agencies will work cooperatively in several areas, including joint funding of data collection and genetic studies of the Queen Charlotte Goshawk, Alexander Archipelago Wolf and other important species. There will be an increased involvement of Forest Service, Fish and Wildlife Service and Alaska Department of Fish and Game biologists in the management, planning and implementation process, such as the Tongass Land Management Plan and other timber harvest plans. Design and implementation of agreements would, among other methods, employ an ecosystem approach to conserving the habitat and insure viable populations of the Queen Charlotte Goshawk, Alexander Archipelago Wolf and other important species of concern. The goals of these efforts are several:

- To manage the forest economically and in an environmentally sustainable manner,
- To provide for viable populations of fish and wildlife and
- To act in time to prevent the need to list species as threatened or endangered.

Field surveys were completed in the 1993, 1994, 1995, 1996 and 1997, following the Regional protocols for the northern goshawk, and no new nesting birds were reported. A pair was sighted in a previous nesting area on Kuiu but no new nesting activity was reported.

Eighty-one percent of the confirmed and probable nest sites in Southeast Alaska are south of Frederick Sound (USDA Forest Service, 1991). The Regional Forester added this species to the Sensitive Species List in 1994.

The Northern Goshawk was also a topic of discussion at the consultation meeting held October 10, 1997 with the interagency implementation team consisting of NMFS, USF&WS, EPA, ADGC, ADEC, and ADF&G (Transition meeting, 1997). No concerns relative to this project regarding the Northern Goshawk was noted.

### Threatened, Endangered or Sensitive Species

Consultation with the U. S. Fish and Wildlife Service, National Marine Fisheries Service and the Alaska Department of Fish and Game (ADF&G) during preparation of this document identified no inventoried resident threatened or endangered species in the project area. The American peregrine falcon (*Falco peregrinus anatum*), which passes through the Forest during spring and fall migration flights; the humpback whale (*Megaptera novaeangliae*), which inhabits nearby waters; and the Snake River sockeye salmon (*Oncorhynchus nerka*), which may occur in the outer waters of the archipelago are all listed as endangered. In addition, the State of Alaska has listed the short-tailed albatross (*Diomedea albatrus*), Eskimo curlew (*Numenius borealis*), blue whale (*Balaenoptera musculus*), right whale (*Eubalaena glacialis*) and humpback whale (*Megaptera novaeangliae*) as endangered. With the exception of the humpback whale, none of these species occur in the area of Kuiu Island.

The Northern (Stellar) sea lion (*Eumetopias jubata*), Snake river spring / summer Chinook salmon (*Oncorhynchus tshawytscha*), and Snake River fall Chinook salmon (*Oncorhynchus tshawytscha*) are all threatened species listed by the National Marine Fisheries Service. There is no important habitat for these species within the area proposed for management activities (See the Biological Assessments and the Biological Opinions in the Planning Record for consultation results).

Northern Goshawk, Marten, Alexander Archipelago Wolf and Other Terrestrial Mammals are important sensitive species on the Tongass National Forest. The Forest Plan covers these species in great detail and those descriptions are incorporated here by reference (See the Biological Evaluation in the Planning Record for more information).

No Federally Listed Threatened or Endangered species will be adversely affected by the proposed actions (see USFWS and NMFS Biological Opinions in the planning record). No Regional Forester's Sensitive species will be adversely affected by the proposed actions (see USFS Biological Evaluation in the planning record).

Both U. S. Fish and Wildlife Service and the National Marine Fisheries were contacted for lists of Threatened or Endangered Species. The only likely land species to occur on Kuiu is the American peregrine falcon and there is no known habitat on the project areas. The marine species that might occur in the waters of and around Kuiu Island are:

1. Steller sea lion
2. Humpback whale
3. Snake River sockeye salmon
4. Snake River spring/summer Chinook salmon and

### 5. The fall Snake River Chinook salmon

None of which will to be impacted by these projects (See the Biological Evaluation/Assessments and the Biological Opinions in the planning record). No nesting marbled murrelets have been discovered in the sale area. We have been working on these units for several years now and have not found any evidence of murrelet use. If marbled murrelets are discovered during layout or sale administration, The Forest Plan Standards and Guidelines will be implemented



Figure 3-4  
Project Area Habitat Connectivity  
Between Large, Medium, and Small  
Old growth Blocks



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- |                                      |                                      |
|--------------------------------------|--------------------------------------|
| Existing Partial Harvest > 30 Yrs    | Beach, Stream, Lake, Estuary Buffers |
| Existing Clearcut > 30 Yrs           | Non-National Forest Lands            |
| Existing/Planned Clearcut = < 30 Yrs | Crane/Rowan Mt Project Area Boundary |
| Proposed Crane/Rowan Harvest Units   | Existing or Planned System Roads     |
| Lakes and Salt Water                 | Existing or Planned Closed Roads     |
| Low Volstrata                        | Proposed System Roads                |
| Medium Volstrata                     | Proposed Closed System Roads         |
| High Volstrata                       | Proposed Temporary Roads             |
| Non Timber Production LUDs           | Wildlife Travel Corridors            |

0 13546 27092

Scale is 1 inch = 13546 feet





# Watershed Effects

## Definitions

**Anadromous Fish** – Fish which mature and spend much of their adult life in the ocean, returning to inland waters to spawn. Salmon and steelhead are examples.

**High Hazard Soil** – Soil material highly prone to mass wasting. Soil type, bedrock type, and slope angle are factors considered when establishing which sites are high hazard.

**Mass Wasting** – A general term for the dislodgment and down slope transport of soil and rock material by gravity. Mass wasting is often used interchangeably with the term landslide.

**Threshold of Concern** – The point or level of activity beyond which an undesirable environmental response is more likely to occur.

**Watershed** – The area that contributes water to drainage or stream.

**Watershed Analysis** – A systematic procedure for characterizing and evaluating watershed response. Factors likely to influence watershed response are used to indicate anticipated effects. Past, present, and proposed actions are considered.

## Introduction

Precipitation along the southeast Alaska panhandle is heavy. Amounts range from about 60 to over 200 inches per year. Heaviest rainfall occurs in the fall months. The driest months are generally May and June. Even these drier months will often receive greater than 5 inches of rainfall. The abundant precipitation has resulted in a unique lush landscape capable of providing a variety of resources. Important resources directly related to the region's prosperity are timber, anadromous fish (salmon and steelhead), hydroelectric power, and municipal water supplies.

The volume, timing and yield of flow from a watershed are interactions dependent on precipitation, vegetation, soils, topography, and geology. The practice of watershed management focuses on the management of natural resources within a drainage basin to protect, maintain, or improve existing watershed processes.

The Tongass Timber Reform Act (TTRA) directed the Forest to protect fish bearing streams with a minimum of 100 foot no harvest buffers. In addition, the Forest Plan Riparian Standards and Guidelines directs the Forest to provide additional stream protection through the use of riparian management area designation beyond the TTRA buffers. The width of these riparian management areas varies depending upon the channel type. These riparian area Standards and Guidelines illustrated in Appendix C, add protection to non-fishery streams. The Forest Plan also directs the Forest to identify and correct problems found within watersheds.



The Clean Water Act and the National Environmental Policy Act further require that cumulative effects be considered. Cumulative effects are the incremental impacts of individual actions within a watershed when added to other collective past, present, and reasonably foreseeable future actions. Watershed analyses determines the possibility of cumulative effects on important riparian area, aquatic habitat values, geomorphic, hydrologic, and ecosystem processes within a watershed.

### Sediment

Natural resource management can affect sediment production. Roads often contribute sediment to stream (Anderson and Potts, 1987). Good road maintenance minimizes effects from roads as ditches and culverts are kept functional, and problems are fixed as they arise (Burroughs and King, 1989, Bilby, 1985). Closed roads generally contribute less sediment than open roads because they are allowed to grow vegetation and stabilize. Taking out the culverts on closed roads reduces the risk of road wash outs.

Harvest units contribute very little sediment to the streams because forest soils in Southeast Alaska have thick organic surface layers. Following BMPs and Standards and Guidelines that minimize soil disturbance during yarding further reduces the likelihood of erosion. Groundcover that protects the soil and the abundant rainfall promote rapid vegetation regrowth.

Landslides, both natural and management induced, can contribute sediment to stream systems. Researchers have found that timber harvest on landslide prone slopes can increase the frequency of landslides beyond natural levels (Swanston and Marion, 1991). Forest policy is to avoid timber harvest and road construction on landslide prone areas. Landslide prone slopes are mapped and their location placed into the geographic information system (GIS).

Streambed particle size distribution can be measured using a technique developed by (Bevenger and King, 1995). This method is one approach for analyzing cumulative watershed effects. The technique allows land managers to compare stream segments over time to determine if management activities have resulted in delivery of fine sediment to streams. The presence of high amounts of fine particles (those 6 mm or smaller) is generally considered detrimental to fish habitat. High percentages of fines have been correlated to reduced salmonid egg and fry survival. Fines reduce the permeability of gravel thereby reducing intergravel dissolved oxygen (Daykin, 1965, Cooper, 1965).

Bevenger and King's studies were conducted in the Rocky Mountain Region of the western U.S. They showed that where areas are disturbed by wildfire or improperly conducted land management activities the percentage of fines found in channel streambeds increased. These disturbed sites generally contained more than 20 percent fines while undisturbed reference streams were below 10 percent total fines.

Sufficient data have not been collected in southeast Alaska to determine with any certainty the applicability of these studies. One study conducted within the planning area found that 7.67 percent of streambed materials in Saginaw Creek were smaller than 0.83mm (Sheridan, et.al. 1984).

Four streams were measured within the planning area. Sampling was done on October 6, 1997. Data collected in May of 1996 from Alex Creek, an unlogged watershed located on Kuiu Island south of the planning area, was used as a control. Table 3-9 gives the percent of fine particles less than 6 mm measured in each stream. All streams are below 20 percent, which can be used as a threshold of concern (Reiser and Bjornn, 1979). Direct comparison between the particle size distribution listed below is not appropriate because of differences in channel type and watershed size.

**Table 3-9 Percent of Fine Particles**

Stream	% < 2mm	% 2mm to 6mm	Total % <6mm
East Fork Security	6	2	8
West Fork Security	4	10	14
Saginaw	10	6	16
Kadake	6	2	8
Alecks (unlogged control)	5	1	6

**Streamflow**

The effects on stream flow are likely related to the amount of clear cutting and total acreage of roads in a watershed. One study on Prince of Wales Island found that low flow increased slightly following extensive clearcut harvest. No other changes in watershed response were found (Bartos, 1989). Another study conducted in British Columbia indicated that when 30 percent of a forested watershed was clearcut harvested that there is a significant effect on water yield. This research from 1971 to 1983 showed a 21 percent increase in total water yield and increased peak flows (Cheng, 1990). Increased peak flows can cause channel adjustment during moderate flood events. Since severe storms in southeast Alaska are generally of long duration and since soils are likely to be saturated regardless of the age of forest cover, significant increases in flow from large magnitude storms events are unlikely.

**Watershed Analysis**

Appendix J in the Forest Plan states that watershed analysis must be completed for any project that proposes to deviate from Riparian Standards and Guidelines as presented in the Forest Plan. No alternative proposes to deviate from these Standards and Guidelines.

In addition, the presence of the following may also trigger watershed analysis:

- high value fisheries,
- high sediment yield risk,
- presence of threatened, endangered or sensitive aquatic species,
- a high density of roads or stream crossings, or
- More than 20 percent of the watershed acres have second growth stands younger than 30 years.

The level and intensity of analysis conducted should be proportional to the specific questions being addressed (USDA Forest Service, 1997a).

**Affected Watersheds**

Timber harvest is being considered in five watersheds larger than one square mile. All five provide habitat for anadromous fish. Table 3-10 displays their sizes and the miles of stream by class.



**Figure 3-5 Affected Watersheds**



**Table 3-10** Affected Watershed Acres and Stream Miles

Watershed	ADF&G Number	Watershed Size (acres)	Miles of Stream		
			Class I	Class II	Class III
West Fork Kadake	109-42-10300B	8,908	17.0	4.7	31.6
Total Kadake	109-42-10300	31,438	73.6	15.8	81.0
Security	109-45-10100	5,954	11.5	3.0	13.2
Dean	109-50-10070	4,725	10.8	3.1	10.3
Unnamed North	109-52-10020	1,718	0.7	2.8	7.0
Unnamed South	109-52-10010	875	0.6	3.0	3.6

### West Fork Kadake Creek

Kadake Creek is the largest producer of salmon on Kuiu Island. The Alaska Department of Fish and Game has identified it as one of 19 "High Quality Watersheds" in Southeast Alaska. Kadake Creek is a popular destination for sport anglers pursuing steelhead and it has been receiving more interest from the outfitter/guide industry. The west fork of Kadake Creek contains 17 miles of anadromous stream. It produces cutthroat trout, steelhead, Dolly Varden char, and pink, chum, and coho salmon. Pink and chum salmon spawning habitat is limited to the lower portion of the watershed where lower gradient, floodplain channel is present. Coho salmon are present throughout the anadromous waters.

Most of the previous harvest in this sub-watershed occurred between 1975 and 1989. Even though this was prior to TTRA, most of the Class I streams received buffers which exceeded the 100' TTRA minimum. According to the GIS database, only 5 acres of riparian area (based on soils inventoried as riparian soils) have been harvested.

A intensive watershed analysis of Kadake Creek was completed in 1995 (USDA Forest Service, 1995a). A watershed restoration project to revegetate all identified sediment sources and correct all road drainage problems is planned for 1998.

### Security Creek Units

The Security Creek watershed, approximately 6,000 acres in size, contains 27 miles of inventoried stream. Security Creek contains nearly 10 miles of anadromous stream that produces pink, chum and coho salmon, Dolly Varden char, and cutthroat and steelhead trout. The east fork of Security Creek contains several small bedrock falls, which are not barriers to coho but may limit pink and chum salmon. Nearly all the anadromous waters on the south fork are available to pink, chum, and coho salmon. Since 1975, pink salmon peak escapement has ranged from several thousand fish to nearly 50,000. The two highest escapements recorded since 1975 were 1986 (47,000 pinks) and 1996 (46,000 pinks). In early October of 1997, over one hundred coho were observed in the area where the 6402 bridge crosses the east fork.

Only one serious impact associated with roads was identified within the watershed. Fill from a road washed out when a 48-inch culvert was plugged with organic debris or when runoff was too great for the culvert to handle. About 1000 cubic yards of coarse textured road fill entered the stream at this site. The date of the failure is unknown, however, it likely occurred during the large storm on December 1, 1988 that resulted in extensive landslides and road drainage failures on north Kuiu Island. Field surveys found few areas of accelerated erosion within the watershed that was associated with timber harvest.

### Crane Units

The three units in the Crane area are not in the Crane Creek watershed. They are in two small watersheds that drain directly into Port Camden. These watersheds do not have anadromous fish present though resident trout are present in the lower reaches.

### Cool Lake Units (Dean Creek)

The two units in the Cool Lake area occur in two different watersheds. Unit 399-13 is in a small, non-anadromous watershed draining directly into Saginaw Bay. Unit 400-18 is partially in the Dean Creek watershed.

The Dean Creek watershed contains 4721 acres. A fishpass was constructed approximately 0.5 miles upstream from the mouth on Dean Creek in 1984 for coho enhancement. The fish ladder made available 9.0 miles of upstream habitat. Although pink and chum habitat may be limited to the first mile above the ladder, coho habitat has been expanded throughout the Class I stream.

### Rowan Mountain Units

The units in the Rowan Mountain area are in three small watersheds draining into Chatham strait. Two of these streams are recognized as anadromous fish streams.

Approximately one mile of coho habitat is present in Unnamed Creek #1 (ADF&G #109-52-10020). Small numbers of pink and chum salmon may use the lower reaches but several partial barriers are present upstream. Both Dolly Varden char and cutthroat trout have been identified in Class II waters in this stream.

Unnamed Creek #2 (ADF&G #109-52-10010), originates from a lake about two miles upstream. The gradient of this stream rises quickly and coho habitat is limited to the first 0.5 mile. Due to the higher gradient, pink and chum habitat is limited to a few hundred feet upstream of the mouth. Resident Dolly Varden char and cutthroat trout are present upstream.

## Effects of Alternatives

Most units included in the Crane and Rowan Mountain Timber Sale proposal were analyzed in the north and east Kuiu EIS. Watershed sensitivity analysis (McCorison et. al, 1989) conducted during the North and East Kuiu NEPA process suggested that no watersheds had exceeded their thresholds of concern (N&E Kuiu FEIS, 1993). This analysis was used as a starting point in developing alternatives for this EIS.

The potential for impacts to watershed resources were analyzed for each affected watershed greater than one square mile in size. Impacts associated with timber harvest vary depending on road location and design, and the type of harvest prescription. Roads on steep terrain or poorly maintained roads will have much greater effects than well-maintained roads on gentle terrain. In this analysis, miles of new road construction and the acres of harvest are used as indicators of the potential risk of adverse impacts. Likewise, total road density in a watershed and the amount of second growth stands less than 30 years old are used as indicators of the potential for cumulative impacts.

The Forest Plan riparian standards and guidelines will be fully applied to all alternatives. Established best management practices (BMP's) will be applied equally to all alternatives (FS Soil and Water Conservation Handbook R10 Amend. No. 2509.22-96-1). Each alternative is expected to meet State of Alaska water quality standards.

### Roads

Table 3-11 shows the number of miles of new road proposed for each alternative. Higher miles of road construction indicates a higher potential for road related sedimentation.

**Table 3-11 Proposed Roads by Alternative (Miles)**

	Alt. 1		Alt. 2		Alt. 3		Alt. 4		Alt. 5	
Watershed	Syst	Temp	Syst	Temp	Syst	Temp	Syst	Temp	Syst	Temp
West Fork Kadake	0	0	0	2.8	0	2.8	0	2.8	0	2.8
Total Kadake	0	0	0	2.8	0	2.8	0	2.8	0	2.8
Security	0	0	0	1.0	0	1.0	0	0	0	0
Dean	0	0	0	0	0	0	0	0	0	0
Unnamed North	0	0	0	0.1	0	0.1	0	0.1	0	0.1
Unnamed South	0	0	0	1.6	0	1.6	0	1.5	0	1.6

To reduce the likelihood of roads causing unwanted impacts to the stream systems, all proposed roads will be closed following harvest activities. Bridges will be removed and culverts will be removed or replaced with water bars.

#### Cumulative Roads

Table 3-12 lists the miles existing and proposed roads and the cumulative road densities (miles of road per square mile of watershed) for the six affected watersheds within the study by alternative. Road condition, whether stable or in need of repair, has more influence on sedimentation than does the actual length of road. A short length of eroding roadbed may yield far more sediment than many miles of stable road. Therefore, areas with higher road densities indicate higher potential risk, but not necessarily greater actual effects. Table 3-12 shows existing road miles and total road densities for each watershed.

**Table 3-12 Road Miles and Densities by Alternative (System and Temporary)**

Watershed	Alt. 1		Alt. 2		Alt. 3		Alt. 4		Alt. 5	
	S <sup>1</sup>	All <sup>2</sup>	S	All	S	All	S	All	S	All
West Fork Kadake										
Miles	11.4	21.8	11.4	24.7	11.4	24.7	11.4	24.7	11.4	24.7
Density	0.82	1.6	0.82	1.8	0.82	1.8	0.82	1.8	0.82	1.8
Total Kadake										
Miles	43.6	81.6	43.9	84.5	43.9	84.5	43.9	84.5	43.9	84.5
Density	0.89	1.66	0.89	1.72	0.89	1.72	0.89	1.72	0.89	1.72
Security										
Miles	9.1	16.3	9.1	17.3	9.1	17.3	9.1	16.3	9.1	16.3
Density	0.98	1.8	0.98	1.86	0.98	1.86	0.98	1.8	0.98	1.8



Watershed	Alt.1		Alt. 2		Alt. 3		Alt. 4		Alt. 5	
	S <sup>1</sup>	All <sup>2</sup>	S	All	S	All	S	All	S	All
Dean										
Miles	6.7	15.3	6.7	15.3	6.7	15.3	6.7	15.3	6.7	15.3
Density	0.91	2.06	0.91	2.06	0.91	2.06	0.91	2.06	0.91	2.06
Unnamed North										
Miles	0	0	0	0.1	0	0.1	0	0.1	0	0.1
Density	N/A	N/A	N/A	0.04	N/A	0.04	N/A	0.04	N/A	0.04
Unnamed South										
Miles	0	0	0	1.7	0	1.7	0	0	0	1.7
Density	N/A	N/A	N/A	1.21	N/A	1.21	N/A	N/A	N/A	1.21

<sup>1</sup>S = System roads – open roads only

<sup>2</sup>All = Open and closed roads

Generally lower road densities are considered to have less risk of adversely effecting watershed function.

Most of the closed temporary roads are in stable condition. On the ground inspections indicate that road density and condition are acceptable assuming needed restoration work is completed as anticipated (Road Condition Survey, 1997).

## Harvest

The four action alternatives present different mixes of diameter limit harvest and clear-cutting. Much of this harvest will be conducted using helicopters to yard logs. It is anticipated that the diameter limit harvest prescription would mimic the general appearance of windthrow generated stands. It is unknown if this prescription will induce further blowdown beyond what might have occurred naturally. Monitoring the results of this harvest prescription will allow further modification of the practice. Where clear cuts are prescribed, approximately 10% of the canopy will be retained within the units. The effects and risks associated with clearcut harvest is better understood than other types of harvest as this has been the dominant harvest prescription in Southeast Alaska. However, retention of approximately 10 percent of the canopy should make these units more natural in appearance and function. Windthrow may serve an important role in rejuvenating site productivity through uprooting and soil churning (Bormann, 1995).

The number of acres harvested is an indication of the degree of risk of altering watershed response. These data are presented in Table 3-13 below for each of the affected watersheds.

**Table 3-13** Proposed Harvest by Alternative (Acres)

Watershed	Alt. 1	Alt. 2		Alt. 3		Alt. 4		Alt. 5	
		Clear cut	Diameter Limit	Clear cut	Diameter Limit	Clear cut	Diameter Limit	Clear cut	Diameter Limit
West Fork Kadake	0	193	0	54	139	54	139	193	0
Total Kadake	0	0	0	54	139	54	139	193	0
Security	0	167	0	0	167	0	352	0	0
Dean	0	47	0	0	47	0	47	47	0
Unnamed North	0	59	0	6	53	6	53	50	12
Unnamed South	0	64	0	56	4	34	4	64	0

**Percent Second Growth**

The percentage of second growth stands less than 30 years old plus the proposed clearcut harvest by alternative is shown in table 3-14 below. The calculations were based on the thirty year period beginning in 1969, 1999 being the earliest possible harvest date anticipated as a result of this planning effort. Since the proposed diameter limit harvest will maintain about 50% of the existing canopy of old trees it is not included in table 3-14. No future timber management within the watersheds analyzed is planned within the next 10 years (USDA Forest Service, 1997h).

**Table 3-14** Percent of Second Growth less than 30 Years Old (1969-1999)

Watershed	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
West Fork Kadake	17.6	19.7	18.2	18.2	19.7
Total Kadake	16.2	16.8	16.4	16.4	16.8
Security	23.0	25.8	23.0	23.0	23.0
Dean	31.2	32.2	31.2	31.2	32.2
Unnamed North	0	3.4	0.3	0.3	2.9
Unnamed South	0	7.3	6.4	3.9	7.3

Since both Security and Dean Creek watersheds have greater than 20 percent second growth stands younger than 30 years, a detailed watershed analysis was completed. (USDA Forest Service, 1997f).

## Summary of Watershed Analyses for Security and Dean Creek

Field reconnaissance showed that most roads near Class I and II streams are on gentle slopes where there is little danger of adversely affecting water quality. Roads near Class III streams are on steeper slopes and present relatively greater risks to water quality. Road restoration work needed within Security and Dean Creek Watersheds were identified. The needed restoration work can be accomplished easily with ongoing forest watershed restoration and road management programs. All alternatives avoid high hazard soils with both roads and harvest units. Most past timber harvest was conducted more than 20 years ago and these units are now fully stocked with second growth trees.

In **Alternative 1**, no further harvest or road construction is proposed within the planning area.

**Alternative 2** proposes the most clearcut harvest of all action alternatives. An additional 167 acres would be clearcut in Security Creek Watershed and 47 acres would be clearcut in Dean Creek Watershed. Following implementation, 26 percent of Security Creek and 32 percent of Dean Creek would be in second growth forest.

An additional 1 miles of road will be constructed in Security Creek Watershed. No new roads will be built in Dean Creek Watershed.

A mix of clearcut and diameter limit harvest is proposed for **Alternative 3**. However, no additional clearcut harvest is proposed in Security or Dean Creek Watersheds. Diameter limit harvest of 167 acres in Security Creek Watershed and 47 acres in Dean Creek Watershed is proposed.

No additional roads will be built in Dean Creek Watershed. . An additional 1 mile of road will be constructed in Security Creek Watershed.

A mix of clearcut and diameter limit harvest is proposed for **Alternative 4**. However, no additional clearcut harvest is proposed in Security or Dean Creek Watersheds. Diameter limit harvest of 352 acres in Security Creek Watershed and 47 acres in Dean Creek Watershed is proposed.

No additional roads will be built in Dean or Security Creek Watersheds.

**Alternative 5** proposes no harvest or road construction within the Security Creek watershed. The Dean Creek watershed will have one 47 acre clearcut with no additional roads.



# Timber Economics

## Definitions

**Mid-Market** – Timber markets have historically been subject to both high and low cycles and will probably do so in the future. In order to incorporate these variations a “normal” or mid-market which represents average long term conditions is developed.

**Pond Log Value** – The difference between the end product selling value and manufacturing costs; the value of logs as they are delivered at the mill.

**Logging Costs** – All costs associated with delivering logs to a milling facility.

**MBF** – Thousand board feet of timber.

**MMBF** – Million board feet of timber.

**Specified Road** – Roads that have a long term management objective

**Temporary Road** – Roads that are needed only for the current timber sale management activities

**Other Temporary Developments** – Includes costs of camp development, mobilization,

## Introduction

The Forest Service Timber Sale Preparation Handbook requires an economic efficiency analysis to compare benefits and costs of a project. The Handbook direction seeks to ensure that projects have at least a 60 percent of normal profit margin during a normal (mid-market) condition. This economic efficiency analysis compares expected gross revenues at the mid-market to estimated costs so net revenues can be determined.

## Mid-Market Analysis

Mid-market values and stump to truck logging costs vary by volume strata. The variations are the result of stand characteristics that vary by volume strata (e.g. number of logs/mbf, defect, grade, and species mix). Pond log value is the value of the logs as they arrive at the mill; the end product selling value minus the manufacturing costs.

All costs required to deliver logs from the stump to the mill have to be considered when determining timber sale economics. These costs include activities associated with stump to truck logging, specified road construction and reconstruction, temporary road construction, camp development, camp mobilization, and log transportation from the landing to the manufacturing sites (truck hauling, barging, and water tow).

The estimated net timber value is determined by subtracting logging costs from the mid-market pond log values of the timber in harvest units of each alternative. Individual units may not be economical to harvest alone, but they are economic when included with other units in the alternative. The result is less productive sites or stands can be managed as productive forestland.

Table-3-15 summarizes timber values and costs to a timber operator of average efficiency, and net stumpage to the government, at the mid-market level for each alternative considered. Before timber is sold, a timber cruise and appraisal will be completed.

**Table 3-15 Timber Cost and Value Summary**

	Alt 2	Alt3	Alt4	Alt5
<b>Volume(mmbf)</b>	23.0	17.8	24.0	21.0
<b>Selling Value (\$/mbf)</b>	\$374.56	\$381.20	\$382.38	\$374.52
<b>Costs (\$/mbf)</b>				
Stump to Truck	\$157.48	\$161.44	\$196.75	\$159.59
Transportation	\$50.57	\$78.16	\$52.23	\$59.33
Temporary Roads	\$7.92	\$10.56	\$4.54	\$5.49
Temporary Road Miles	2.42	2.24	1.40	1.49
Other Temp Develop	\$5.04	\$6.72	\$5.00	\$5.68
Specified Roads	\$44.21	\$58.92	\$43.83	\$49.78
Specified Road Miles	6.59	6.59	6.59	6.59
<b>Profit and Risk</b>	\$59.18	\$59.72	\$59.18	\$59.42
<b>Net Stumpage Value</b>	\$48.88	\$5.72	\$19.52	\$34.45
Indicated Advertised Rates	\$93.09	\$64.64	\$63.35	\$84.23
USDA Forest Service, 1997g				

Alternative 2 and 5 provides the best return. Alternative 3 and 4 provides the least return.

## Current Vs Middle Market

Current timber sale economics are somewhat better than the mid-market scenario used to compare alternatives here. Several factors have combined to produce a market that is higher than what has been experienced on the average:

- Markets up and down the west coast have been influenced by the Presidents Forest Plan for the Pacific Northwest to address the Spotted Owl issue. Because of scarcity of wood timber sales have been selling for more than advertised rates
- Here in Southeast Alaska, appraised rates have not yet incorporated the effect of the pulpmill closures and probably do not accurately reflect the current demand as evidenced by the recent higher than advertised bids received for timber sales.

## Effect of Diameter Limit on Selling Value

To test the effect of the 2-aged silvicultural prescription (diameter limit) on selling values, existing timber sale cruise information for timber stands within the Crane and Rowan

Mountain Project Area was analyzed.

Application of the diameter limit to the combined Saginaw and Rowan Settlement cruise statistics suggests selling values would increase approximately \$10.00/MBF. over an even aged clear-cut harvest example. This is because the utility volume and poorer grades of lumber are more heavily represented in the trees being left to provide wildlife legacies and maintain natural disturbance patterns. This is reflected in the above table 3-15.





# Scenery

## Definitions

**Adopted Visual Quality Objectives** – These are VQO's that are incorporated into the Forest Plan. They consider other land management decisions such as intensive timber production.

**Distance Zones**– distance at which the landscape is visible, as viewed from Visual Priority Travel Routes and Use Areas. Used as a frame of reference for discussions of landscape characteristics and effects of management activities.

Foreground – 0 to 1/2 mile

Middleground – 1/2 mile to 3-5 miles

Background – greater than 3-5 miles

**Visual Priority Travel Route or Use Area** – viewing locations from which scenic impacts are assessed, typically defining where the greatest concern for scenic quality exists.

**Visual Quality Objectives** – Visual Quality Objectives (VQO's) are established by combining different characteristics of scenery such as how varied the landscape looks, whether or not it is seen from well used viewpoints, and how far away it is. Visual Quality Objectives provide measurable standards for management based on the landscapes' scenic characteristics and public viewing concern. The objectives describe both visual resource goals and levels of variation from the characteristic landscape.

**Viewshed** – A viewshed is defined as a geographically distinct landscape that people can view or perceive as a single unit.

## Introduction

Scenery is everything that people see in the landscape. The visual compositions that we see are interpreted in part by each person's past experiences and expectations. Scenery may evoke feelings of emotion, inspiration, and well being. For that reason, government laws, policies, and directives require National Forests to consider scenic values. Within this context, scenery is regarded as a primary resource "to receive equal consideration with other resources", and, that scenery conservation principles are "to be applied not only in especially sensitive areas or unusual circumstances, but routinely in all activities" (FSM 2380.3).

Southeast Alaska scenery generally includes mountains, glaciers, water, sky, weather, trees, animals, boats, people, and development. While there are an infinite number of personal interpretations of scenery, general preferences are predictable based upon cultural norms and the predominant values of society. Some people using major travel routes and use areas expect the forest to look natural while others don't mind seeing evidence of development.

North Kuiu Island is distinguished in landscape character by rolling terrain of between 300-1,500 feet separated by an intricate network of waterways. Scattered block-like mountains, having rounded hummocky summits 2,000 to 3,500 feet in elevation rise above the general level of the lowlands. Numerous small rocky islands, shorelines and rock reefs are evident in the waterways. Generally other rock forms are isolated and visually insignificant. There are

outstanding limestone cliff formations located in the Port Camden area. Outer coasts exposed to the open ocean exhibit a variety of geological-erosion forms such as occasional small gravel beaches, indistinct cliff formations and rocky promontories. Spruce and hemlock forest is predominant. There are also significant areas of muskeg.

Primary access for recreational use on Kuiu Island depends to a large extent on saltwater access. Developed facilities are limited to a few canoe/kayak portage trails that provide access across narrow isthmuses to create loop opportunities, avoid exposed bodies of water, and eliminate traveling long distances, two Forest Service recreation cabins along the island's eastern shore and a new three sided log shelter in the Bay of Pillars. Waterfowl hunting is sporadic and usually confined to estuaries. Black bear are prevalent and hunted throughout the area. Fishing for salmon, steelhead, and other trout species occurs in many of the island's streams. Other activities include harvesting edible shellfish, crab, and shrimp. Simply searching for solitude and testing one's self-reliance skills as well as viewing scenery and wildlife are other activities. Although recreational opportunities abound, numbers of users are low. This is no doubt due to the remoteness of the area. Outfitting and guide use is increasing in and around Kuiu Island. Small groups are typical for hunting and fishing related activities, but larger groups are known to participate in educational and scenic touring in activities such as kayaking.

There are no regularly scheduled means of public transportation to Kuiu Island, although air taxi service is available on a charter basis. Roads, accessing the interior of the project area are not linked to any inter-island transportation network. The closest Alaska Marine Highway ferry terminal is located in the community of Kake where many canoe and kayaking trips begin.

Logging associated with roading began on north Kuiu Island in the early 1960's at Saginaw Bay. In 1972, Kuiu Island became the contingency area for the APC Long-Term timber sale contract, until rescinded in 1995. The visual condition and appearance reflect the past demands for timber production in the area. South and southeast Kuiu Island exists in a relatively pristine condition with only a minor amount of older harvest still visible. East Kuiu Island, particularly in the Three-Mile Arm area has some visible evidence of recent timber harvest.

## Desired Future Visual Condition

The desired future visual condition of North Kuiu Island is guided by management prescriptions in the Forest Plan. All units proposed for harvest in the Crane/Rowan Mountain EIS are located within the Timber Production land use designation. This management prescription provides for suitable timber lands to be managed for the production of wood on a sustained yield basis. Road systems are developed in conjunction with timber management to be compatible with recreational uses, hunting and fishing, and other public uses. Timber harvest will generally appear highly evident and a visually dominant characteristic in most seen areas within the Timber Production LUD. A more detailed discussion of the Timber Production management prescription can be found in the Forest Plan (TLMP, 1997).

## Adopted Visual Quality Objectives

The adopted Visual Quality Objectives for the Timber Production management prescription are Modification in the foreground and Maximum Modification in all other viewing locations



within this LUD. These may be further refined to meet the desired future condition described for specific management prescriptions. Non-development land use designations also exist and are interspersed across North Kuiu Island. The following visual quality objectives apply to the project area:

**Retention:** Changes in the landscape must not be visually evident to the casual forest observer. Modifications must repeat form, line, color, and texture found in the surrounding natural landscape.

**Partial Retention:** Changes in the landscape may be visually evident, but must be integrated into and visually subordinate to the surrounding landscape. Activities may introduce form, line, color, and texture not common in the surrounding landscape, but they should not attract attention.

**Modification:** Changes in the landscape may visually dominate the surrounding natural landscape, however they must repeat the naturally established elements of form, line, color, and texture to appear compatible with the surrounding natural landscape.

**Maximum Modification:** Management activities may visually dominate the characteristic or surrounding natural landscape, yet when viewed in the background activities appear as natural occurrences within the landscape.

Table 3-16 shows the area and percent of each VCU for each adopted visual quality objective in the Forest Plan.

**Table 3-16 Adopted Visual Quality Objectives**

VCU	Retention		Partial Retention		Modification		Maximum Modification	
	Acres	%	Acres	%	Acres	%	Acres	%
399 – Saginaw Bay	2511	10%	0	0%	3,530	14%	19,252	76%
400 – Security Bay	1085	4%	11,341	41%	1,216	4%	14,226	51%
402 – Rowan Bay	3674	12%	52	0%	921	3%	27,120	69%
420 – Port Camden	96	2%	358	6%	1,149	18%	4,688	74%
421 – Kadake Creek	1211	4%	4615	13%	869	3%	27,348	80%

Source: Sukine Area GIS

## Visual Priority Travel Routes and Use Areas

Visual Priority Travel Routes and Use Areas identify viewing locations from which scenic impacts are assessed. These areas typically define where the greatest concern for scenic quality exists. The expression used to indicate visibility of proposed activities from Visual Priority Travel Routes and Use Areas is that it is “seen”. “Seldom-seen” landscapes indicate that they are not viewed from priority travel routes and use areas.

Visual Priority Travel Routes and Use Areas associated with North Kuiu Island include Rowan, Security, Saginaw, Kadake Bays, Port Camden, Keku Strait, and Chatham Strait and

Frederick Sound. All these destinations receive seasonal, intermittent to moderate use over the course of the year. Recreation use in the area is increasing. It is typically marine related recreation during the summer months. Cruise ships and sightseeing excursions travel along Chatham Strait on the West Side of Kuiu Island, and are reported in Tebenkof Bay and Security Bay. The Alaska Marine Highway is located to the north of Kuiu Island in Frederick Sound. Scenic guidelines for the management of scenery visible from these locations are outlined in the Forest Plan.

Kadake and Fall Dog Creeks have been recommended in the Forest Plan for further consideration for Wild and Scenic River designation. The river corridors are recognized as Use Areas for dispersed recreation on the Petersburg Ranger District Visual Priority Travel Routes and Use Areas listing. No proposed units would be visible from Fall Dog Creek or Kadake Creek as topography or vegetation would screen harvest from view. Areas adjacent to these river corridors are in the Timber Production Land Use Designation. The Adopted Visual Quality Objectives for this management prescription would be applied.

## Alternatives and Effects

For the purposes of this analysis, Value Comparison Units (VCUs) are being used as a basic unit of land to assess visual conditions. A viewshed is defined as a geographically distinct landscape that people can view or perceive as a single unit. Viewsheds may overlap, depending on the viewing distance and position of the viewer. From changing positions such as travel routes, viewsheds constantly shift and overlap.

The Forest Plan provides measures for retaining pristine to natural appearing landscapes for areas allocated other than Timber Production. These areas represent to a great extent most locations of high scenic concern. In those areas allocated for intensive timber management, a moderate degree of emphasis is provided in retaining scenic quality. The greatest visual effects occur immediately following timber harvest. Impacts associated with timber harvest may vary, and the degree of impact depends upon the intensity of harvest (size and shape), design (silvicultural treatment and location), ground conditions (soil characteristics and slope), and orientation to viewer. Impacts are typically most evident in the near to mid distances (foreground and middleground).

### Cool Lake Units

The Cool Lake units are visible from Saginaw Bay, which is used for various types of recreation. Much of the bay's eastern shoreline provides opportunities for rock hounding, fossil collecting, and the study of Native culture. Of special interest is Halleck Harbor. A gentle sloping sand beach and protected anchorage attract numerous boaters. A log transfer site on the south side of the bay provides access to the road system on Kuiu Island. Waterfowl hunting occurs at the head of the bay, and fishing in Saginaw Creek. Outfitters and guides utilize Saginaw Bay for their operations and there is a Special Use Permit for a residence near the head of the bay.

The limestone bedrock adjacent to Saginaw and the Keku Islets has been identified as having a high potential for cave formation similar to those found on Prince of Wales Island. Opportunities exist for future trail development to Cool and Ledge lakes, allowing easier access for stream and lake fishing.

#### Alternatives 2 and 5:

Activities proposed in these alternatives are identical and have similar visual consequences. Two units (399-13 and 400-18) would be visible to varying degrees from Saginaw Bay, and designed for clear cut harvest. While not located in VCU 399, Unit 400-18 is visible to the

greatest degree from Saginaw Bay. Both units would meet the Modification VQO as seen from Saginaw Bay and Frederick Sound.

#### **Alternatives 3 and 4:**

Proposed harvest design in these alternatives would have slightly less visual effect by achieving a Partial Retention VQO in Unit 400-18. Silvicultural treatment and visual effect would remain the same for Unit 399-13 as in Alternatives 2 and 5.

#### **Cumulative Effects:**

Past, present and future logging activities would result in a landscape dominated by openings of various ages, design characteristics and sizes. The Saginaw Bay area has been extensively logged over the years and its appearance reflects the intensity of these activities.

## **Security Units**

Fishermen, hunters, and recreationists' view the landforms on either side of this bay, and a private residence located on the eastern shoreline. Secure anchorages exist at numerous points along the bay's shoreline. Excellent waterfowl and black bear hunting occur at the head of the bay. The State of Alaska has designated some of the large islands, and parts of the eastern shoreline in the northeast corner of the bay, as a State Marine Park. No facilities currently exist in the Marine Park.

Well-defined slopes rise along the shoreline in the inner bay. The landscapes associated with these areas consist of rolling terrain with topographic relief varying from 1,000 to 3,000 feet. The area is largely covered with hemlock/spruce forests, with interspersed mountains and summits serving as focal points. Five units are within the Security Bay viewshed and located several miles south from the head of the bay. Portions and varying combinations of these units are visible in the middleground and/or background from this body of water in the proposed alternatives.

#### **Alternative 2:**

Alternative 2 would have the greatest visual impact in proposing Units 400-8, 9, 11, and 12 for clear cut harvest. Unit 400-12 would not be visible from inside Security Bay and the remaining 3 units would achieve the Modification VQO.

#### **Alternatives 3 and 4:**

Activities proposed in these alternatives are similar in visual effect. Alternative 3 proposes partial harvest treatment for Units 400-9, 11, 12, and clear cut harvest for Unit 400-8 which is partially screened from view. Alternative 4 proposes partial harvest treatment for in 400-9, 11, 12, and 13. The Partial Retention VQO is achieved in both these alternatives.

#### **Alternative 5:**

No timber harvest is being proposed and development is deferred. The characteristic landscape will be maintained in its current condition.

#### **Cumulative Effects:**

The East Side of Security Bay exists in a highly modified condition, and would continue to appear so into the year 2011. In the reasonably foreseeable future, views from the marine park of the West Side of the bay would be maintained in a pristine, natural condition. The salt chuck to the south would continue to provide a primitive setting.

## **Rowan Mountain Units**

A variety of activities occur within Rowan Bay. As the site of a past sortyard, logging camp and log transfer facility, the associated development remains evident. Commercial fishing and crabbing vessels also use this area. Access is possible to the interior road system by use



of the existing log transfer facility at nearby Rowan Bay. Hunting and sport fishing occur in the estuary of Rowan Bay also. Boaters frequently anchor in a small cove on the south shoreline near the bay's mouth.

The north side of Rowan Bay is visually dominated by Rowan Peak, which reaches an elevation of 3210 feet. Alpine slopes are scattered with isolated stands of timber, and provide a distinctive landscape setting as seen from the bay or Chatham Strait. Outside the bay and to the north, avalanche chutes are evident with exposed white rock on the upper reaches capturing the viewer's attention. This landform is complex in its steep, incised notches and valleys facing onto saltwater. This area exists in a natural appearing condition.

Several logging units and associated roads are apparent along the south side of Rowan Bay. These units dominate views from the camp, dock, and Rowan Bay in general. Past timber harvest at the head of the bay are also evident, but do not tend to dominate the view due to a greater viewing distance and the age of the regenerating stands.

Eleven units are proposed in varying combinations and silvicultural treatments on the lower slopes north of Rowan Bay. They face the entrance to the bay and are visible in the middleground distance from Rowan Bay, and background distance from Chatham Strait.

### **Alternatives 2 and 5:**

Alternatives 2 and 5 have similar effects and the greatest potential visual impact. Units 402-25, 26, 27, 28, 29, 30, and 31 would be visible in Alternative 2 from the entrance to Rowan Bay which is the location for optimal viewing. A Modification VQO would be achieved. Alternative 5 is nearly identical to Alternative 2 in visual effects with the exception of treating Unit 29 and adding Units 50 and 51 as partial harvest. An overall Modification VQO would also be achieved. Harvest activities proposed in this VCU have been designed to work with naturally occurring features found in the landscape. Avalanche chutes and vertically oriented openings are visible from Rowan Bay when looking north. Units have been designed to minimize their dominance on the landscape and work with these features as well and existing harvest units located to the west.

### **Alternatives 3 and 4:**

Activities proposed in these alternatives are similar in effects and would have significantly less visual impact than those proposed in Alternatives 2 and 5. Design for partial harvest treatment in the majority of units would achieve an overall Partial Retention VQO as seen from the entrance to Rowan Bay, and to an even lesser degree from Chatham Strait.

### **Cumulative Effects:**

Entering Rowan Bay, the viewer currently encounters a landscape altered by timber harvest activities. Patterns established through clear cutting dominate the seen area, and would continue to do so through 2011. Management activities located on the north side of Rowan Bay would not appear as evident as other locations within the bay.

## **Crane Creek Units**

These units overlook Port Camden where recreation activities commonly occur. The configuration of the bay and the estuarine areas attract recreation use. The island complex on the east shoreline provides a good anchorage for boaters. Known shoreline occurrences of petrified material, including fossils of tree species no longer indigenous to Alaska, are also of special scientific interest. Bear and waterfowl hunting opportunities exist at the head of Port Camden. Here canoeists/kayakers can cross into the Bay of Pillars by using the Bay of Pillars Portage Trail or into Three-Mile Arm using that portage. These portage routes have been identified as high visual sensitivity, reflecting the scenic expectations of visitors using these access routes. Dispersed camping occurs near the trailheads. Future recreational use may be

influenced by the development of the Slippery Creek Fishpass. Pristine opportunities for lake and stream fishing exist at Slippery Lake. An impromptu recreation site at the head of Port Camden adjacent to the road system has been developed by former residents of Rowan Bay, and contains an anchorage, primitive boat ramp, and a good beach.

The landscapes in this VCU vary from rolling forested hills to steeper walled slopes and alpine peaks at the head of the bay adding visual variety for those traveling the 14-mile saltwater passage through the bay. Past timber harvest is dominant as seen from the head of the bay, near the isthmus to Three-Mile Arm and along the north side near the isthmus to the Bay of Pillars. The entrance to Port Camden is in a natural condition. The peak located furthest south in the head of Port Camden is unique with its views of alpine character, waterfalls and avalanche chutes cascading to lower elevations.

There are 3 units located midslope on the West Side of Port Camden. These units are visible in the middleground from the center of the bay, and to a lesser degree from other locations in the bay.

#### **Alternatives 2 and 5:**

Both these alternatives are identical in harvest design and treatment. Units 420-46, 47, and 48 are proposed for clear cut harvest extending development further into Port Camden. These units were designed not to dominate the characteristic landscape and achieve the Modification VQO.

#### **Alternatives 3 and 4:**

Alternatives 3 and 4 are identical in visual effect proposing partial harvest treatment for Units 420-46, 47, and 48 with a less than 10 acre area of Unit 420-48 being clear cut. These alternatives would both achieve a Partial Retention VQO.

#### **Cumulative Effects:**

Timber harvest along the east-facing ridge appears evident upon entering Port Camden. Management activities would be apparent throughout the VCU with future timber harvest entries. Harvest activities located at the head of the bay and east and west sides would dominate the landscape.

Excellent steelhead, trout, and salmon fishing is possible in the waters of Kadake Creek. Bear and waterfowl hunting occur throughout Kadake Bay. Much of the use is associated with an existing Forest Service public recreation cabin located at the mouth of Kadake Creek in Kadake Bay. Boats can anchor near the bay entrance or at Gill Harbor to the north, which also contains an excellent salmon fishery. This area receives moderate to high use by residents of Kake for subsistence fishing purposes.

Landscapes in this area are typical of those on Kuiu Island. Entering the bay, the traveler passes through a 1,300 foot opening that expands to 1.5 miles wide once inside the bay. The Kadake Bay Forest Service cabin is located on the south shore of the bay. Views in the area are expansive, and there is evidence of past timber harvest in the Kadake Creek area. The tidflats are a dominant feature, and the rise and fall of tides determine visitor access.

#### **Alternatives 2, 3, 4, and 5:**

Units 421-49, 50, and 51 are similar in visual effects as not being visible from any identified Visual Priority Travel Route and Use Area. All units are located outside the proposed Kadake Creek wild and scenic river corridor. Areas outside the river corridor are to be managed according to the adjacent land use designation. Alternatives 3 and 4 differ from 2 and 5 by proposing partial harvest treatment of these units. All units in all alternatives achieve a higher

## **West Fork Kadake Units**



VQO for this location than that Adopted in the Forest Plan.

### Cumulative Effects:

Past, present and future logging would result in a landscape dominated by timber harvest opening of various ages, design characteristics, and sizes.

### Other Viewing Areas

Other viewing areas would include those not identified as visually sensitive, or seen from established Visual Priority Travel Routes and Use Areas. These locations are classified as “seldom-seen”, and are managed with less visual emphasis than those areas with higher sensitivity. For these areas, the Maximum Modification VQO would apply.

## Summary of Environmental Effects

The four action alternatives would have varying degrees of scenic impact to the landscapes of Kuiu Island. The selected units under each alternative are fundamentally similar, the variation relating to scenic effects are primarily a result of the silvicultural treatments. Alternatives 2 and 5 propose development using a predominantly clear cut harvest method and would have the most visual impact and greatest cumulative effects of all the alternatives. Timber harvest would dominant the characteristic landscapes where viewed from seen areas. Alternative 3 mix clear cutting and partial harvest methods and achieves a less impacting effect than in Alternatives 2 and 5. Alternative 4 would have the least direct and cumulative visual effects by proposing predominantly partial harvest treatment for all seen areas. The design of this alternative would result in a natural appearing character in all viewing locations. Alternative 5 is similar to Alternative 2 but does not proposed harvest within the Security Bay viewshed. All alternatives would meet or achieve a higher Adopted Visual Quality Objective as identified in the Forest Plan.

**Alternative 1** (No Action) would benefit the developed landscapes of north Kuiu Island by proposing no action. No development would occur allowing further regeneration of units previously harvested. Those landscapes in visually sensitive areas currently dominated by timber harvest would recover to a more natural appearing condition.

**Alternative 2** Generally, activities proposed in alternative 2 would be consistent with the overall theme of maximizing timber volume. Clear cutting harvest further develops this regime in areas already visually dominated by timber management. Expansion of development in areas west of Rowan Bay would occur. Extension of the road on the western side of Port Camden would expand visibility of harvest from this body of water. In all other areas, further development of harvest would not significantly alter the landscape beyond what currently exists. Visual Quality Objectives ranging from Partial Retention to Maximum Modification would be achieved.

**Alternative 3** proposes a mix of partial harvest treatment and clear cutting. Scenic impact would be slightly less visually than Alternative 2 as a result of fewer clear cut units in the Rowan and Saginaw Bay viewing areas. Harvest visible from Port Camden would also be noticeably less evident than Alternative 2 as a result of the fewer clear cuts and units proposing alternative silvicultural harvest design. The scenery would appear modified but still resemble natural patterns to a great extent. Visual Quality Objectives ranging from Partial Retention to Modification would be achieved.

**Alternative 4** The primary objective of alternative 4 is to emulate natural disturbance patterns in the landscape. Alternative 4 would have the least visual change of any “action” alternative. Textural changes in the landscape resulting from partial harvest appear less



striking than the forms created by clear cut openings. Visual Quality Objectives of Partial Retention to Modification would be achieved.

**Alternative 5** is similar to Alternative 2 in scenic effects. The differences exist in proposing no harvest in the Security Bay VCU and two additional partial harvest units in the Rowan Bay viewshed. The additional harvest in the Rowan Bay area would not be a significant impact beyond that proposed in Alternative 2 since the added harvest would be partial cutting. Visual Quality Objectives achieved in this alternative would range from Partial Retention to Maximum Modification.



# Other Environmental Effects

## RECREATION

Many of the recreation issues and concerns on North Kuiu Island center on the views from saltwater bays. These views affect local and non-local recreationists in small boats, yachts, and kayaks, cruise ships and also clients using the services of commercial outfitters and guides. The specific scenery issues are addressed in the Scenery section.

To describe, identify, and quantify recreation settings, the Forest Service uses the Recreation Opportunity Spectrum (ROS). The ROS categorizes areas by their activities, remoteness, access, and experiences in a spectrum of classes from Primitive to Urban. (See Glossary). The Crane and Rowan Mountain project area includes four of the seven classes in the Recreation Opportunity Spectrum: Roaded Modified, Semi-primitive motorized, Semi-primitive non-motorized, and Primitive.

Most areas proposed for timber harvest activities will not affect the existing recreation character. However, some change will occur near the Rowan Mountain area, where timber harvest will change about 150 acres from Primitive to Roaded Modified; about 450 acres from Semi-primitive Motorized to Roaded Modified; and about 900 acres from Semi-primitive non-motorized to Roaded Modified.

The Crane and Rowan Mountain timber sales are not expected to noticeably change the recreation experience for Kuiu Island users. Areas used for recreation are generally along the shoreline where no timber harvest is proposed.

Outfitters and guides also use Kuiu Island. In 1997, 34 permits were issued that identified Kuiu as part of their operating area. As with other recreation uses, there are no effects anticipated to outfitters and guides. Levels of outfitter and guide uses that may be allowed and described in the Stikine Area Outfitter and Guide Environmental Analysis will not change as a result of this timber sale.

## SOILS

There will be little or no difference in effect on soils between alternatives, since all high hazard soils have been avoided, and soils management practices are applied to all alternatives. All alternatives are expected to equally meet or exceed Soil Quality Standards (USDA Forest Service, 1992b), and therefore, have no measurable adverse effect on the long-term productivity of the soil. Specific soils concerns and applied management practices are described on the road and unit cards in Appendix B.

Soils management practices applied to all roads and units in each alternative include:

**Changes to ROS**

**Effects to  
Recreation Users**



### Soils Management Practices

- Partial suspension of logs (lead end of log suspended above the ground) is recommended on all cable yarding settings. This is primarily to prevent displacement of the nutrient rich, surface soil layers.
- Full suspension of logs (both ends of the log suspended above the ground) by skyline cable systems or helicopter is designated where needed to prevent excessive erosion or landslides.
- Shovel yarding is designated on gently sloping soils that have thin easily disturbed surface soils. This is to minimize displacement of organic horizons and exposure of mineral layers that could result in the establishment of brush species such as alder and/or salmonberry to the detriment of conifer regeneration.
- Roads are designed to maintain the natural drainage pattern to prevent excessive instream erosion and detrimental changes in soil drainage.
- Length and width of temporary spur roads are to be kept to a minimum to reduce the amount of forestland taken out of production.
- All disturbed areas of bare mineral soil will be revegetated by application of the prescribed grass seed and fertilizer during the next growing season.

## Caves and Karst

A portion of the project area in the vicinity of Saginaw Bay south to Kadake Bay consists primarily of carbonate rock. This area does contain karst features and some caves. (USDA Forest Service, 1997c) However, no activities are proposed in this karst area in any alternative.

## Wetlands

Wetlands are valued for their physical, chemical and biological functions. Physical functions include flood conveyance, surface and ground water regulation, sediment retention and temperature moderation. Chemical functions include nutrient storage, pH moderation, and carbon storage. Biological functions include habitat for terrestrial, aquatic, and marine plants and animals, as well as wood fiber production.

Like much of Southeast Alaska, Kuiu Island contains a large proportion of wetlands. Approximately 29 percent of the project area is classified as wetland as defined by the Federal Manual for Identifying and Delineating Jurisdictional Wetlands (USCOE, 1987). Resource values associated with these wetlands vary greatly depending on characteristics such as the type of wetland, proximity to water bodies and landscape position. Different wetland types are found from sea level to alpine within the project area and are described as follows.

### Wetland Types

#### Muskeg (3,066 acres)

Bogs (commonly called muskegs) are dominated by sphagnum moss with a wide variety of other plants adapted to very wet, acidic, organic soils. They typically contain some stunted lodgepole pine trees less than 15 feet high. These wetlands function as areas for recharge of groundwater and streams and for deposition and storage of sediment, and nutrients. They are a valuable source of biological and vegetative diversity. Muskegs are most commonly found in broad valley bottoms and on rounded hilltops.

Alpine/Subalpine Muskeg (10,363 acres) – Vegetation is a combination of muskeg and sedge meadows on peat deposits, and low growing blueberry and heath on higher rises. Stunted lodgepole pine and mountain hemlock is common. These wetlands are important for snow storage and can be a source for snowmelt water throughout the summer??. They also provide summer habitat for terrestrial wildlife species. These wetlands are located at elevations of 1200 to 2500 feet

**Sedge Fens (2,275 acres)**

Fens are characterized by a diverse community of sedges and forbs and occasional stunted trees, usually spruce or hemlock. They occur in landscape positions where they receive some runoff from adjacent slopes resulting in somewhat richer nutrient status than bogs. These wetlands function as areas for recharge of groundwater and streams, deposition and storage of sediment and nutrients, and for waterfowl and terrestrial wildlife habitat, including black bear, mink, river otter, and beaver.

**Forested Wetlands (7,586 acres)**

Forested wetlands include a number of forested plant communities with hemlock, cedar, or mixed conifer overstories, and ground cover consisting largely of skunk cabbage and deer cabbage. These wetlands function as recharge areas for groundwater and streams, and for deposition of sediment and nutrients. They also produce commercial forest products.

**Estuarine Wetlands (840 acres)**

Estuaries are unique brackish environments where fresh water mixes with salt water. They are the most valuable wetland in the project area supporting complex and productive ecosystems for critical fish and wildlife habitat. Grasses and sedges, especially tufted hairgrass, Lyngby's sedge, and dune wildrye are the dominant species in the upper tidal zone. Common plants on the upper beaches include beach-carrot, beach pea, large headed sedge, paintbrushes, and lupine.

**Muskeg/Forested Wetland Mosaic (20,707 acres)**

Small patches of muskegs and forested wetlands as described above arranged in a mosaic pattern on the landscape. These areas have vegetative properties of each of the respective components but function somewhat differently in respect of habitats due to their small size and spatial arrangement.

**Forested, Wetland/Upland Mosaic (88 acres)**

Small patches of forested wetland as described above arranged in a mosaic pattern with forested non-wetland ecosystems. The forested wetland portion is typically on concave positions in these gently sloping or rolling landscapes.

The Forest Service, as well as other federal agencies, is required by Executive Order 11990 to preserve and enhance the natural and beneficial values of wetlands when carrying out their land management responsibilities.

The potential impact to wetlands is indicated by the amount of forested wetlands proposed for harvest. Harvest of forested wetlands is proposed on mineral soils only. Harvest on organic soils is not included in any alternative. (TLMP Record of Decision, 1997)

All roads in the project area are designed and used solely for silvicultural purposes. It is unlikely these roads will be used for other purposes because they are not connected to any community or ferry system. The amount of road proposed on wetlands is displayed in Table 3-17. Roads and harvest units were designed to minimize potential impacts to high value wetland areas since it is not possible to avoid all areas classified as wetland. These roads are located on forested wetlands or on forest/muskeg complexes where it is not practical to locate them on adjacent uplands. See road cards (appendix B for details of road location relative to

wetland. Wetland vegetation, soil drainage, or hydric character of a wetland will not be measurably altered by road construction except for the width of the roadfill itself. The area covered by the road prism is normally about 24 feet wide and amounts to approximately 2.9 acres per mile.

**Table 3-17 Miles of Roads Proposed on Wetlands**

	Existing Roads	Alt. 1	Alt. 2	Alt 3	Alt 4	Alt. 5
Muskeg	6.8	0	0	0	0	0
Sedge Fen	3.8	0	0	0	0	0
Forested Wetland	11.3	0	0.3	0.3	0.3	0.3
Estuarine Wetland	0	0	0	0	0	0
Subalpine Forested Wetland Mosaic	0	0	0	0	0	0
Muskeg Forested Wetland Mosaic	27.6	0	1.8	1.8	1.4	1.4
Forested Upland Wetland Mosaic	0	0	0.1	0.1	0.1	0.1
Total	49.5	0	2.2	2.2	1.8	1.8

## Floodplains

The Executive Order 11988, dealing with floodplain management, was largely intended to reduce the risk of property loss, minimize the impact of floods on human safety, health and welfare; and to restore and preserve the beneficial values served by floodplains. None of the proposed alternatives would result in human occupancy of floodplains. Because the proposed action would have no floodplain development other than stream crossings, there will be no anticipated loss of property values, nor will human health, safety, or welfare be adversely affected. In general, road location, construction measures, drainage structures, and timber harvest will have minimal effect on the natural or beneficial values of the floodplains.



## Fisheries

The project area, approximately 160,000 acres, is divided into 7 VCU's and contains 196 watersheds. There are at least 750 miles of stream in the project area and 468 acres of lakes. Descriptions of the fisheries for each drainage have been included within in the watershed section.

### Stream Classification

Two types of stream classification systems have categorized streams. One classification, recognizes four stream classes and is defined by the Regional Aquatic Habitat Management Handbook as follows:

- Class I--- Streams with anadromous or adfluvial fish habitat; or high quality resident fish waters listed in Appendix 68.1, Region 10 Aquatic Habitat Management Handbook (FSH 2609.24), June 1986; or habitat above fish migration barriers known to provide reasonable enhancement opportunities for anadromous fish.
- Class II--- Streams with resident fish populations and generally steep (6-15 percent) gradient (can also include streams from 0-6 percent gradient) where no anadromous fish occur, and otherwise not meeting Class I criteria. These populations have limited fisheries values and generally occur upstream of migration barriers or have other habitat features that preclude anadromous fish use.
- Class III--- Perennial and intermittent streams with no fish populations but which have sufficient flow or transport sufficient sediment and debris to have an immediate influence on downstream water quality or fish habitat capability. These streams generally have bankfull widths greater than 5 feet and are highly incised into the surrounding hillslope.
- Class IV--- Other intermittent, ephemeral and small perennial channels with insufficient flow or sediment transport capabilities to have an immediate influence on downstream water quality or fish habitat capability. These streams generally are shallowly incised into the surrounding hillslope.
- Non-streams--- Rills and other watercourses, generally intermittent and less than 1 foot in bankfull width, little or no incision into the surrounding hillslope, and with little or no evidence of scour.

There are 253 miles of Class I, 82 miles of Class II and 411 miles of Class III stream in the project area. The Class IV stream is a new class and due to their small size and short length they will be identified and mapped at the project level for the affected area.

The other classification system is based on channel morphology and is defined by the Region 10 Channel Type Users Guide. This classification system uses nine fluvial process groups and 38 individual channel types to describe stream reaches. All but the Glacial Outwash Process Group are present on Kuiu Island.

ES	ESTUARINE PROCESS GROUP
PA	PALUSTRINE PROCESS GROUP
FP	FLOODPLAIN PROCESS GROUP
GO	GLACIAL OUTWASH PROCESS GROUP
AF	ALLUVIAL FAN PROCESS GROUP
LC	LARGE CONTAINED PROCESS GROUP
MM	MODERATE GRADIENT MIXED CONTROL PROCESS GROUP
MC	MODERATE GRADIENT CONTAINED PROCESS GROUP
HC	HIGH GRADIENT CONTAINED PROCESS GROUP

Appendix C contains descriptions and photos of each process group.

### Fish Production

Management Area S04 (North Kuiu) contains only 26% of the area of Kuiu Island yet has the capability to produce 46% of the pink salmon and 56% of the coho salmon on Kuiu Island. This can be attributed to a higher proportion of floodplain and moderate gradient mixed control channel process groups than other areas of Kuiu Island (USDA Forest Service, 1997b).

With the implementation of the TLMP Riparian Standards and Guidelines there is not expected to be any decrease in the habitat capability due to timber harvest by any alternative. Site specific stream buffer width information has been included on the unit cards (Appendix B) to insure proper protection of the fisheries resources.

### Riparian Management Areas

The Riparian Management Area is defined as land areas delineated in the Forest Plan, to provide for the management of riparian resources. Specific standards and guidelines, by stream process group, are associated with the riparian management areas and are displayed in Appendix C.

### Prior Timber Harvest

A number of Class I and II streams have been affected by past timber harvest activities. Saginaw, Kadake, Browns, and Rowan Creeks have had the most harvest in the riparian zone. Table 3-18 shows that Security Creek has had only 29 acres harvested within 100 feet of Class I streams and 99 acres harvested between 100 and 300 feet of Class I streams (USDA Forest Service, 1997b).

**Table 3-18 Area Harvested Within 300 Feet of Class I Streams**

Watershed	Acres Within 100 feet	% Within 100 feet	Acres Between 100-300 feet	% Within 300 feet	Total Area Within 300 feet
West Fork Kadake	26	2	103	8	1,260
Whole Kadake	100	2	394	8	5,164
Security	29	3	99	12	839
Dean	7	1	69	8	806
Unnamed North	No Existing Harvest				
Unnamed South	No Existing Harvest				

### Stream Buffers and Windthrow

In 1995 the Petersburg Ranger District randomly sampled 31 stream buffers adjacent to units harvested between 1968 and 1993 on Kuiu Island, representing approximately 10 miles of buffer. The amount of blowdown in the buffers, calculated as the percentage of the blowdown basal area compared to total buffer basal area, varied from 1 percent to 66 percent with a mean of 17 percent. Seventy-six percent of all blowdown occurred in the outer 65 feet of the buffer and 22 percent was within the stream. For each downed tree the azimuth, species, length, dbh and location within the buffer was recorded. (USDA Forest Service, 1995b)

A GIS wind disturbance inventory of Kuiu Island contains information on historical wind events as far back as 500 years and also contains wind direction where available. In addition,

Mark Kramer, a graduate student from the University of Oregon has developed a windthrow hazard map for Kuiu Island, which displays high, medium and low windthrow categories. This information has been incorporated into unit design and displayed on the unit cards. It will be used to design reasonably windfirm buffers in the future and along with continued effectiveness monitoring will help increase our understanding of the affect of wind upon stream buffers.

## Roads

There is little difference between alternatives in both the length of new road construction and the number of stream crossings. Table 3-19 shows that none of the alternatives propose new roads crossing Class I streams and there are only a few Class II stream crossings none of which will require road construction timing clauses to protect downstream Class I fish habitat. The 46041 road crosses the most Class 2 and 3 streams but is proposed for all the action alternatives.

**Table 3-19** Number of Stream Crossings by Alternative

Stream Class	Alternative 2	Alternative 3	Alternative 4	Alternative 5
I	0	0	0	0
II	2	2	2	2
III	15	15	13	13

## Subsistence

Kuiu Island is a major source of subsistence fish and shellfish for Kake and other nearby communities. The 1987 Tongass Resource Use Cooperative Survey (TRUCS) indicated fish and shellfish made up 32 to 80 percent of the per-capita harvest of principle resources harvested by subsistence users of the analysis area (University of Alaska et. al., 1987) Residents of Kake have emphasized the importance of protecting salmon habitat, and specifically the streams flowing into Security Bay, which contains an important late-fall chum salmon run (Fall Dog Creek). Tebenkof and Pillar Bay are two sockeye systems on Kuiu Island used for subsistence fishing. The waters around Kuiu Island are also important for the collection of shellfish and seaweed.



## ANILCA Section 810 Subsistence Evaluation Process

### Key Terms

ANILCA – Alaska National Interest Lands Conservation Act of 1980

SECTION 810 – Portion of ANILCA that requires evaluation of subsistence impacts before changing the use of these lands.

Section 810 of ANILCA requires a Federal agency, having jurisdiction over public lands in Alaska, to analyze the potential effects of proposed land-use activities on subsistence uses and needs. An ANILCA 810 analysis should include:

1. An evaluation of the possibility of effects on subsistence uses
2. A distinct finding on whether the proposed action may significantly restrict subsistence uses
3. Notices and hearings if the evaluation results in a significant restrictions determination. If, following a public hearing a finding of a significant restriction remains, the responsible official decides to proceed with the proposed project.

Evaluation criteria used to assess the effects of the proposed alternatives are:

- Changes in abundance or distribution of subsistence resources,
- Changes in access to subsistence resources, and
- Changes in competition from non-subsistence users for those resources.

The evaluation determines whether subsistence uses within the analysis area or portions of the area may be significantly restricted by any of the proposed action alternatives. Wildlife, fish, shellfish, marine mammals, other foods and timber are the resources used for subsistence that are evaluated in the subsistence report. A Subsistence Specialist Report has been completed and is in the planning file (USDA Forest Service, 1997d).

## Crane/Rowan Mountain Subsistence/ANILCA 810 Findings

The Findings are based on the evaluation in the Subsistence Specialist Report on abundance, distribution, supply and demand, access and competition for harvested resources in the project area and the Kuiu Island area. The area is not an extensively used subsistence harvest area. There would be some decreases in habitat capability for wildlife under the action alternatives. However, the habitat would be capable of maintaining populations greater than projected harvest demand under all alternatives through the rotation. The effects on finfish and shellfish populations are expected to be minimal and should not affect the supply available for subsistence harvest.

Although there may be some long-term changes in access, we do not expect that the increased access would reduce subsistence harvests below historic levels, and the habitat capability should be sufficient to meet all of the increased demand for deer. Alternative 2 builds 9.0 miles of roads, Alternative 3 builds 9.0 miles of roads, Alternative 4 builds 8.0 miles of roads and Alternative 5 builds 8.1 miles of roads. No roads will be constructed under Alternative 1. Closure of new road segments to motorized access under all action alternatives will further mitigate effects of access. Since this road system is not tied to the State Ferry System and no permanent towns or villages are located on Kuiu Island, the access is problematic at this point in time. A substantial increase in competition for subsistence resources from non-rural community residents is not projected to result from the alternatives proposed.

**Preliminary Subsistence Finding:**

**The proposed action will not cause significant restriction on subsistence wildlife, fish, marine mammals, other foods and timber resources.**

### Marine Environment

Southeast Alaska has approximately 30,000 miles of shoreline. Along this length a great diversity of habitats account for the complexity of Southeast Alaska's estuarine and tidal environments.

The marine environment encompasses a wide variety of ecosystems. This section deals primarily with the intertidal and subtidal marine environments that are subject to effects from log transfer and storage facilities, since those are the points of concentrated activity associated with the marine transportation of logs. Activities outside the areas of concentration are widely dispersed and any potential effects would be short-term and/or diluted below detectable thresholds. This document describes the marine environment and current conditions at Rowan Bay and Saginaw Bay log transfer facilities (LTFs).

The shallow marine waters and associated mud flats that are found in the protected coves and bays provide vital habitat for some commercially important species, such as Dungeness crab, herring, and juvenile salmon. They are part of a complex and dynamic ecosystem that includes shrimp, flatfish, marine worms, starfish, sponges, anemones, sea cucumbers, urchins, shellfish, plankton, marine algae, and other organisms.

The potential impacts that are of concern at log transfer sites relate primarily to the deposition of bark. Laboratory tests show that bark deposits may be a source of toxic organic leachates that may be deleterious to salmon fry and crab larvae. The accumulated bark also smothers benthic organisms. The rate of bark accumulation varies with conditions at each facility. The design of the facility partially determines the amount of bark lost (loss of bark has been directly related to the speed of log entry into the water), and the configuration of the location determines the dispersion of the bark by currents and winds. Log raft storage areas accumulate bark at a much slower rate than the immediate area of the log transfer facility. Little quantified information is available that documents decomposition, flushing, recovery times, recolonization rates, or other information about the longevity of bark and its affects on the marine benthic habitat.

An effect of bark and debris accumulation is that littleneck clams and bay mussels have been shown to be eliminated when as little as 4 to 5 inches of bark accumulated (Freese and O'Clair 1984). Further, Conlan and Ellis (1979) reported mollusks and several polychaetes were excluded by bark debris greater than 2.5 centimeters in thickness, and the effects of bark may last several decades. Deposition of more than a 1-centimeter layer of wood waste has been observed to produce losses of suspension feeding benthos, with major community composition changes associated with a 5-centimeter accumulation (Conlon and Ellis 1979). In 15-centimeter deposits, suspension-feeding organisms were absent and the area was dominated by a few abundant deposit feeding organisms. It can be assumed that other plants and animals that live in and on the bottom would be similarly affected.

The Rowan Bay and Saginaw Bay log transfer facilities (LTFs) have been in operation long enough that deposited bark is a feature of these sites. A SCUBA diving survey of bark debris at the Rowan Bay LTF was conducted during July and August 1990. Approximately 28 acres had a continuous coverage of bark greater than 10 centimeters deep and 6 of those acres had bark greater than 100 centimeters deep. The reported amount of bark in 1990 apparently increased from 1988 when the LTF was previously monitored. The SCUBA diver monitoring in 1990 indicated some difficulty determining the depth of bark debris over the soft natural substrate. This was because of poor underwater visibility and the difficulty of identifying the substrate by feel through dry suit gloves. In 1994, Rowan Bay was placed on the Section 303d



Tier 1 list by the EPA for bark accumulation at the LTF. This list identifies water quality-limited waterbodies, which require water quality assessments to verify the extent of pollution, and what controls are in place or needed. A dive survey conducted in 1996 found that the Rowan Bay LTF still exceeded the maximum zone and depth of deposit. Due to this bark accumulation, all future movement of logs through this transfer facility will be done on barges, eliminating the build up of more bark. Reconstruction of the bulkhead at the Rowan Bay LTF to accommodate barging is expected to occur in 1998.

The Saginaw LTF was inspected for accumulating bark in 1987 and 1988. Bark was present between the shore and an offshore rock ridge. Currents over and beyond the ridge appear to sweep the bark away. In 1988, inside the ridge, approximately 1 acre had a continuous coverage of debris more than 10 centimeters deep.

Freese (1987) indicates that once benthic deposits of bark are in place, they are very resistant to decomposition or transport away from the immediate area. In general, however, the area impacted by bark is relatively restricted. At 13 LTFs evaluated in Southeast Alaska, bark deposits average 2.4 acres per site (Freese, 1987).

Toxic substances occurring as leachates from bark precipitate in saltwater; therefore, leachates do not appear to be a major problem in open water or where good circulation exists (Sedell and Duval, 1985). Recently, dissolved substances, such as hydrogen sulfide and ammonia, have been shown to occur in the interstitial water of bark deposits when bark accumulates on the bottom (O'Clair and Freese 1984). If Dungeness crabs burrow into the bark deposit, the number of eggs produced is decreased, food habits change, and overall crab survival is decreased. It should be noted that this type of effect has been observed in only one bark accumulation in the field (Rowan Bay log transfer facility) and that, in general, crabs were not found in bark accumulations at a number of other log transfer facility locations. Studies have demonstrated that waste wood leachates in the water can be toxic in concentrated form to fish and shellfish, such as shrimp and salmon. However, in the natural environment, toxic concentrations should not be reached due to adequate flushing and circulation. Regulations requiring monitoring of bark and wood accumulation help quantify the effects in the zone of deposit.

Other effects associated with existing log transfer facilities relate to oil, grease, and petroleum pollution. The source of these contaminants may be the operation and maintenance of equipment used in log handling and transfer operations. Persistent loss of small volumes of petroleum products is a concern, as water soluble compounds have been shown to be toxic to marine larvae and eggs at concentrations of 0.1 mg/l. Daily monitoring for the presence of any visible oil sheen on the water is a standard condition for all new log transfer site permits.

Following are descriptions of the marine environment for the two existing LTFs, Rowan Bay and Saginaw Bay

## **Rowan Bay**

Six catalogued anadromous fish streams enter Rowan Bay. Rowan Creek and Brown's Creek are the most important producers. Rowan Creek also produces substantial numbers of coho and chum salmon. Pink and chum salmon juveniles rear for 1 to 2 months in Rowan Bay each spring following emergence and migration from the streams.

Dungeness crab harvest for the combined Rowan Bay and adjacent Bay of Pillars for 6 years of reported data from 1969 through 1984 was 62,000 pounds. The exact division of the catch between Rowan Bay and the Bay of Pillars is unknown, but based on observations of the number of crab trap floats in Rowan Bay a substantial portion comes from Rowan Bay.

### Saginaw Bay

Four catalogued salmon producing streams enter Saginaw Bay with Saginaw Creek and Straight Creek being the largest producers.

Dungeness crab are harvested in Saginaw Bay. The estimated catch has been with held because of State of Alaska nondisclosure regulations. For one year during the period 1969-'84 commercial harvest occurred for spot and coonstripe shrimp. Amount of harvest was again with held because of nondisclosure regulations.

### Summary of Effects

The impacts to the marine environment are expected to be minimal since the Saginaw Bay LTF will not be used and logs will be barged from the Rowan Bay LTF. Little additional impact to the marine environment would occur at Rowan Bay as this LTF is already constructed and has been previously used for watering logs. Bark has already accumulated on the bottom in front of this facility. Construction of the barging facility will require the addition of rock fill material in the area of the existing LTF.

Monitoring of the bark accumulation at both LTFs (a requirement of the current permits) indicates the bark accumulation covers approximately 28 acres at Rowan Bay and less than 1 acre at Saginaw Bay. The size of the bark accumulation is believed to be related to site characteristics of the individual LTFs more than to the volume of logs watered at the sites. (Schultz and Berg , 1976) monitored 32 LTFs and found no significant relationship between bark depth and the age of the LTF, volume of timber dumped, type of LTF, and other independent variables. They speculated tidal action, currents, and physical and chemical characteristics of the bottom influenced the amount of bark at an LTF.

Repeated monitoring at five LTFs on the Stikine Area, including Rowan Bay and Saginaw Bay, has indicated no obvious proportional relationship between the area of bark accumulation and the volume of logs watered at that site. In other words, doubling the volume does not double the area of the bottom covered by the bark. Monitoring results indicate that additional use of an LTF tends to increase the depth of the bark and likely covers a small amount of the presently unimpacted substrate on the fringes of the previous bark pile. Additionally, the size of the pile may decrease during periods of non use of the LTF.

## Heritage Resources

### Definitions

**Culturally Modified Trees** - Culturally Modified Trees (CMTs) are trees that have been altered by people in the past. Usually this refers to the removal of strips of bark or other alterations made to the woody portion of the tree.

**Heritage Resources** - The physical remains of districts, sites, structures, buildings, networks, events, or objects used by humans in the past. They may be historic, prehistoric, architectural, or archival in nature. Heritage resources are non-renewable aspects of our national heritage.

**Historic Property** - Any heritage resource included in, or eligible for inclusion in, the National Register of Historic Places. The term includes artifacts, records and remains that are related to and located within such properties.

**State Historic Preservation Officer (SHPO)** - The official appointed or designated pursuant to Section 101(b)(1) of the National Historic Preservation Act of 1966, as amended, to administer the State Historic Preservation Program.

### Introduction

Kuiu Island heritage resources reveal a rich cultural heritage spanning the last several thousand years. Since 1974 archaeologists have completed reconnaissance and complete heritage resource surveys of various Forest Service activities on Kuiu Island. Detailed information about project surveys and known sites is contained in files at the Stikine Area Supervisors Office. Site records, especially those related to site location, are generally not available to the public because of the fragile nature of heritage resource sites. The following discussion summarizes the known project area heritage resources and describes field surveys conducted within the project area.

The types and frequencies of known and suspected heritage resource sites within the Kuiu Island project area are presented in Table 20. There are 35 project area sites (historic, indigenous and 14(h)(1) sites) on the Alaska Heritage Resource Survey, a statewide listing of recorded heritage resources. None of these sites are listed on the National Register of Historic Places. Most of the sites are eligible for the National Register of Historic Places, however very few have been formally evaluated for eligibility. Additional 52 locations are suspected heritage sites, which have not been field verified, or former special use permit sites, which may be historic. In addition there are 20 locations applied for as Native allotments, which may represent former sites. None of these sites are in or near areas of proposed direct impact (e.g. harvest units, roads, etc.).

**Table 3-20** Types and Frequencies of Project area Heritage Resource Sites

VCU	SUP	NA	SS	HS	14(h)(1)	IS	TOTAL
399	10	4	5	2	2	8	31
400	24	1	4	0	2	0	31
402	0	0	3	1	0	11	15



VCU	SUP	NA	SS	HS	14(h)(1)	IS	TOTAL
420	0	11	5	1	0	7	24
421	0	4	1	0	0	1	6
TOTAL	34	20	18	4	4	27	107

SUP=Special Use Permit Sites; NA=Native Allotment; SS=Suspected Sites; HS=Historic Sites Listed on the Alaska Heritage Resource Survey; 14(h)(1)=Historic and Cemetery Sites Selected by Sealaska Corporation under 14(h)(1) of the Alaska Native Claims Settlement Act; IS=Indigenous Sites Listed on the Alaska Heritage Resource Survey.

Indigenous sites include villages, middens, temporary camps, fish weirs, fish traps, cemeteries, forts or defensive sites, culturally modified trees, petroglyphs, pictographs and garden sites. Historic period sites include cabins, camps, fur farms, canneries and salteries. Native allotments include those parcels of land applied for by Native Alaskans. Special use permits include those areas that were granted Forest Service permits prior to 1912, but have not been verified on the ground as historic sites. Suspected sites are those that are reported in the literature or have been observed by non-professionals, but which have not been field verified.

Prior to the field survey conducted for this study, a total of 26 heritage resource surveys had been conducted in the project area at various levels of intensity (see Table 3-21). These range from reconnaissance surveys (n=14), where areas of expected sites are examined, to complete surveys (n=12) which are designed to identify all heritage resources within a given area. The vast majority of these surveys have been conducted by archaeologists examining various Forest Service projects. Forest Service archaeologists surveyed almost 33 miles of coastline and about 1,250 acres within the project area prior to the current study.

**Table 3-21 Cultural Resource Surveys in the Kuiu Island Project area**

VCU	Miles of Surveyed Coastline	Acres Surveyed	Survey Type	By Whom	Date
399	2.41	N/A	Reconnaissance	Reger	1974
		20.0	Reconnaissance	Roberts	1985
		11.5	Reconnaissance	Roberts	1988
TOTAL		31.5	3 Reconnaissance Surveys		
400	0	90.0	Complete	McCallum	1990
TOTAL		90.0	1 Complete Survey		
402	6.98	N/A	Reconnaissance	Reger	1974
		24.0	Reconnaissance	Arndt	1979
		60.0	Reconnaissance	Roberts	1988
		7.3	Complete	McCallum	1989

VCU	Miles of Surveyed Coastline	Acres Surveyed	Survey Type	By Whom	Date
		155.0	Complete	McCallum	1990
TOTAL		336.3	3 Reconnaissance, 2 Complete Surveys		
420	23.0	N/A	Reconnaissance	Reger	1974
		6.0	Reconnaissance	Plaskett	1977
		82.0	Reconnaissance	Arndt	1979
		16.0	Reconnaissance	Arndt	1979
		12.0	Reconnaissance	Arndt	1979
		284.0	Reconnaissance	Arndt	1979
		5.5	Reconnaissance	Roberts	1985
		53.0	Complete	Roberts	1988
		60.0	Complete	McCallum	1989
		72.0	Complete	McCallum	1991
		18.0	Complete	Kauneckis	1991
		27.0	Complete	Kauneckis	1991
		3.0	Complete	Kauneckis	1992
		7.0	Complete	Kauneckis	1992
TOTAL		640.5	7 Reconnaissance, 7 Complete Surveys		
421	0.37	N/A	Reconnaissance	Reger	1974
		39	Complete	Hardin	1991
		116.0	Complete	Kauneckis	1992
TOTAL		155.0	1 Reconnaissance, 2 Complete Surveys		
TOTALS	32.76	1,253.3	14 Reconnaissance 12 Complete Surveys		

Sealaska Corporation contracted for an archaeological and historical inventory of the region to identify historic and cemetery sites for selection under 14 (h)(1) of the Alaska Native Claims Settlement Act (Sealaska Corporation 1975). Sealaska selected several sites on Kuiu Island, including four that have been interim conveyed or conveyed to Sealaska Corporation within the project area. None of these sites will be affected by the proposed timber sale.

#### Environmental Effects

Heritage resources within the project area may contain significant information on past

environmental conditions and human lifeways, possibly including information related to past conditions along the north Pacific Rim. These resources are both fragile and non-renewable. Primary impacts can include alteration to the settings of sites; alteration of above ground objects, features and structures; as well as the spatial relationships among them; and disturbance or destruction of subsurface heritage deposits. Secondary impacts may include a higher frequency of site vandalism due to increased access from constructed roads.

Federal laws and regulations (including the National Historic Preservation Act of 1966, as amended; the Archaeological Resources Protection Act of 1979, as amended; and the American Indian Religious Freedom Act of 1978) establish a process for considering the impacts of Federal projects on heritage resources. Section 106 of the National Historic Preservation Act requires us to identify heritage resources within proposed project areas, determine which are significant or eligible to the National Register of Historic Places, evaluate effects to significant sites, and design and implement measures to negate any adverse effects. We undertake this process in consultation with the Alaska State Historic Preservation Officer (SHPO) and the Advisory Council on Historic Preservation, where adverse effects are possible.

Forest Service archaeologists designed a theoretical model that assesses the probability of heritage resources across the project area. The model considers elevation and other variables for establishing a high probability for discovery of heritage resources. Factors we used to define the probability zones are general guidelines. It is apparent that people who have inhabited the area focused their activities on the coastline and marine environment. Scientists have confirmed that sea levels in the islands of southeast Alaska fluctuated throughout time. Therefore, it appears as though past sea levels play an indicator role in locating most heritage resources and the key criterion for establishing probability zones is elevation above the present coastline.

We define the high probability zone as all areas between mean high tide and 100 feet in elevation. In addition to this, the high probability zone includes a zone around all streams and lakes that have historically contained anadromous fish; mineralized zones exhibiting historic mining activities; geologic features such as karst areas, littoral caves and areas of volcanic sediments likely to contain bluff shelters; areas of traditional ethnohistoric subsistence use; and aboriginal myth and legend sites. The low probability zone is all areas outside the high probability zone.

We applied this probability model to each alternative to gauge the potential effect to heritage resources. Generally, those alternatives which favor more development pose a greater threat to undiscovered heritage resources. Implementation of a 1,000-foot beach fringe and estuary buffer zone for all alternatives effectively eliminates the areas of highest potential for heritage resources. An examination of ground disturbing activities in relation to the heritage resource probability model indicates that none of the alternatives threaten the preservation of heritage resources eligible to the National Register of Historic Places. The "no action" alternative by its very nature constitutes the least threat to heritage resources.

In 1992 Sükine Area archaeologists surveyed four timber harvest units within the project area. They discovered 249 culturally modified trees, but no other heritage resources were discovered in the surveyed areas. The recorded culturally modified trees are widely scattered and are not eligible for the National Register of Historic Places. The vast majority of recorded culturally modified trees are triangular bark-stripped Alaska cedar found on ridges and other well-drained areas. The fact that they are scattered and lack associated sites or artifacts indicates they are not significant. Table 3-22 presents a summary of surveyed areas and results. In addition to the survey of timber harvest units, archaeologists also examined other areas within VCU's 399, 400 and 402 to confirm the assumptions of the heritage



resource probability model. Archaeologists surveyed about 290 acres outside of proposed direct impact areas, including a portion in the low probability zone.

**Table 3-22 Cultural Resource Survey Areas and Results**

VCU	Unit Number	Acres	Heritage Resources Present
400	400-8	29	None
402	402-28	7	109 CMTs
	402-29	23	140 CMTs
	402-30	10	None
TOTAL		69	249 CMTs

CMTs = Culturally modified tree

Previous surveys combined with our current study present a reliable understanding of heritage resource distribution across the project area. Combined, archaeologists have surveyed over 1,600 acres within the project area, including about 33 miles of coastline. The known and reported heritage resource sites in the project area are surrounded by protective buffers and will not be affected. Implementation of a 1,000-foot beach fringe and estuary buffer zone effectively minimizes the probability of impacting heritage resources eligible for inclusion in the National Register of Historic Places.

The Stikine Area submitted a report to the Alaska State Historic Preservation Officer presenting the heritage resource probability model, an extensive literature and files search and the results of the field survey. We determined that there are no historic properties (sites eligible to the National Register of Historic Places) within the area of potential effect for this project. We propose to conduct post-construction monitoring of all areas of ground exposure along the proposed road system, regardless of placement within the heritage resource probability model. This form of monitoring will serve to validate the assumptions of the heritage resource probability model as to the spatial distribution of heritage resources and to determine the effectiveness of site discovery techniques used during the field survey. The Alaska State Historic Preservation Officer agreed with our determination that there are no sites eligible to the National Register of Historic Places within areas of potential effect.

### Cumulative Effects

Impacts from decay, natural landscape changes and development pose a threat to the preservation of significant heritage resources in the project area. Future timber harvest combined with other ground disturbing activities could result in a loss of heritage resources. Increased access to heritage resource sites also poses a potential threat from vandalism and looting. Known heritage resource sites will be periodically monitored to determine if any natural or human-caused impacts are occurring. Previous heritage resource inventories indicate most if not all of the heritage resources are located within a short distance of the present coastline. It is impossible, however, to determine the exact number and nature of heritage resources that are threatened by future development. Maintenance of beach fringe and estuary protective buffer zones for future development will effectively lessen the potential impact to heritage resources. Implementation of field inventories and various mitigation measures will reduce the potential loss by preserving significant sites and by providing data on those that cannot be preserved.

No heritage resources eligible to the National Register of Historic Places have been identified

during previous heritage resource surveys of timber harvest units and associated development. Validation monitoring has confirmed assumptions about the heritage resource sites. No project area sites, other than scattered culturally modified trees, have been located at elevations above 50 feet.





### Ecological Characteristics- Commercial Species

## Timber Resource

Four commercial tree species are present in the analysis area. They are: western hemlock, mountain hemlock, Alaska-cedar, and Sitka spruce. Each of these species possesses certain characteristics that will determine its location and abundance on the landscape. Each species forms plant communities or plant associations with other trees, shrubs, and forbs. The species composition of a plant association reflects the soil, climate, and disturbance history of a site.

### Western Hemlock

Western Hemlock is the most abundant tree on the forest. Very shade tolerant, it dominates the reproduction under dense forest canopies. With time it replaces less shade tolerant species on most sites. Seed is produced in most years, with heavy crops every few years. The seed is small and can be carried long distances in strong wind. Since its seeds germinate easily, and since viability is high, natural reproduction can be obtained through various reproduction methods from single tree selection to clearcutting. A shallow root system makes it susceptible to wind throw, and its thin bark make it susceptible to logging injury. Principal insect pests include the brown-headed budworm and the hemlock sawfly. Most tree mortality occurs when populations of both insects are high. Most mortality to mature hemlock is from root and stem rotting fungi. Trees may be killed outright, or more commonly, from breakage of decayed stems during wind storms. Dwarf mistletoe is a destructive parasite that reduces tree vigor, reduces wood quality and makes trees more susceptible to infection by decay fungi. It is spread by seeds that are ejected under force from overstory trees to the understory. Common western hemlock plant associations include: Western hemlock/Blueberry, Western hemlock/Blueberry/Shield fern, and Western hemlock/Blueberry/Skunk cabbage.

### Mountain Hemlock

Mountain hemlock is a minor commercial species on the forest. Mostly restricted to subalpine communities, it is present at lower elevations on poorer sites where its presence is generally an indication of Mixed-Conifer plant associations. It is very shade tolerant but is slow growing and competes poorly with other tree species on good sites. Seed production is moderate, even in the best seed years. Since mountain hemlock has not been extensively harvested in southeast Alaska, it is known whether regeneration problems exist. A shallow root system makes it susceptible to wind throw, and its thin bark make it susceptible to logging injury. Principal insect pests include the brown-headed budworm and the hemlock sawfly. Most tree mortality occurs when populations of both insects are high. Most mortality to mature hemlock is from root and stem rotting fungi. Trees may be killed outright or from breakage of decayed stems during wind storms. Mountain hemlock is rarely infected by dwarf mistletoe. In the subalpine, Mountain hemlock/Blueberry and Mountain hemlock/Blueberry/Marsh marigold are the most common plant associations. At lower elevations mountain hemlock is commonly found in Mixed-conifer/Blueberry and Mixed-conifer/Blueberry/Skunk cabbage plant associations where it occurs along with Alaska-cedar, western hemlock and Sitka spruce.

### Alaska-Cedar

Alaska-cedar is a minor, but valuable, commercial tree found within the project area. At lower elevations it is commonly found on poorly drained organic soils. Best growth is at mid elevations where it grows with western hemlock. Alaska-cedar is moderately shade tolerant and produces irregular cone crops. Its seeds are heavy with small wings and are not carried far by wind. Seeds have delayed germination and seedling growth is usually slow. The wood is highly resistant to decay. Alaska-cedar decline is the most important disease. Its cause is not known. Common plant associations are Western hemlock-Alaska cedar/Blueberry and

Western hemlock-Alaska cedar/Blueberry/Skunk Cabbage.

### **Sitka Spruce**

Sitka spruce is the largest and one of the most valuable commercial trees. It is found on a variety of sites from sea level to the subalpine. It is intermediate in shade tolerance but is a prolific seed producer. Consequently, some seedlings are usually present in forest understories. Its seeds are small and can be carried for great distances by the wind. Seed germination is high and natural regeneration can be obtained through various means. Sitka spruce is shallow rooted and vulnerable to compaction and blowdown. The bark is relatively thin and susceptible to logging injury. Spruce beetle is the most serious insect pest. Most outbreaks originate in blowdown or logging debris and spread to adjacent standing timber. The heart wood of Sitka spruce is somewhat resistant to decay. However, root and stem decay account for most mortality of mature trees by directly killing the trees or making them susceptible to breakage from wind. Sitka spruce plant associations are found primarily at low elevations on well-drained alluvial fans, riparian areas, or avalanche chutes. Common associations include: Sitka spruce/Devil's club, Sitka spruce/Blueberry-Devil's club, and Sitka spruce/Blueberry-Devil's club/Skunk cabbage.

## **Silvicultural Systems**

Silvicultural systems are used to tend, harvest, and re-establish forest stands. Treatments are applied throughout the life of the stand for the purpose of reaching a desired future condition. Treatments include the harvest or regeneration of the stand, intermediate cuttings, and other cultural treatments necessary for the replacement and development of the forest stand. No single silvicultural system can produce all desired combinations of products and amenities from a particular stand or project area. A prescription is a written record that includes treatments prescribed for the stand. Prescriptions are prepared and written by a certified silviculturist.

Silvicultural systems can be even-aged, two-aged, or uneven-aged. Even-aged systems produce stands that have trees of the same or nearly the same age.. Uneven-aged systems create stands that have three or more age classes.

All of the areas proposed for timber harvest will be restocked within 5 years as required under the National Forest Management Act of 1976 (NFMA). Harvested sites must contain a minimum of 300 well dispersed trees per acre by the fifth year following harvest to be considered successfully regenerated. Regeneration (stocking) surveys will be conducted on all harvest units the third full growing season after yarding is completed. This survey is used to determine whether additional reforestation efforts are required. Where necessary, a fifth year survey is used to certify that regeneration has been successful.

### **Precommercial Thinning**

Regeneration on clearcuts may result in seedling numbers in excess of three to four thousand trees per acre. Although these stands will thin naturally, production of usable wood fiber can be hastened with less dense stocking. Growth and yield models using a 100-year rotation indicated that precommercial thinning increases timber production. Precommercial thinning reduces competition for sunlight and nutrients. Growth of understory plants and the remaining conifers is accelerated. Precommercial thinning can also be used to regulate species composition of crop trees.

Recent trends in forestry have moved toward stands with wider spaced trees. More light penetrates to the forest floor favoring shrub and forb development thereby increasing wildlife forage. As stands mature, they reach the stage where tree density begins to block light to the forest floor. Thinning before canopy closure would again promote understory growth, enhance forage production and increase tree diameter growth. However, wider spacings



result in large branches that are retained longer.

Site quality affects the timing of precommercial thinning. On low quality sites, where tree growth is slow, precommercial thinning is planned 20-25 years or more after harvest. On highly productive sites, thinning is planned 15-20 years after harvest. Tree growth models show that thinning to 12 by 12 foot spacing increases volume production by nine percent over unthinned stands or stands thinned to 18 by 18 foot spacing.

It is not known whether precommercial thinning will have application in uneven-aged systems. It may have use where group selection is used. Likely, it will not be used where diameter limit cuts or other methods of individual tree selection are used.

### Pruning

Pruning can be used to improve wood quality and increase value by maximizing the amount of clear wood. Pruning wounds heal quickly when branches are small, and pruning allows more light to reach the forest floor. This stimulates the growth of understory vegetation for wildlife forage. To date, only a few second-growth stands have been pruned. Whether pruning will play an important role in the future in managed forests is not known. Much needs to be learned concerning its long term benefits in relation to cost associated with pruning.

### Commercial Thinning

Currently, commercial thinning is rarely used in southeast Alaska. Most managed stands are not of sufficient size to produce commercial products. Thinning is rarely economical because of the limited demand for small diameter logs and the expenses associated with logging.

In southeast Alaska, silvicultural options have often been chosen to avoid the risk of windthrow or damage to residuals. In areas of high windthrow risk entry was deferred or the stands were clearcut. Other forms of regeneration harvest were generally not considered. Areas with moderate or low windthrow risk were thought to have a wider range of options and some uneven-aged regeneration cuts were made. Uneven-aged systems have also been used in a few areas where there were visual or wildlife habitat concerns.

Economics has also been an important factor in choosing the harvest method. In most situations, clearcutting with cable yarding is more cost efficient than other methods. Although cable yarding is not possible with most uneven-aged systems, it can be used where logs are first yarded laterally a short distance and then yarded up hill through corridors. Where down hill yarding is required, cable yarding does not work well for uneven-aged management, but it can be used on clearcuts. Shovel and helicopter yarding lend themselves to both even-aged and uneven-aged systems. Shovel yarding is often economical but cannot be used on steep slopes. Helicopter yarding is usually the most expensive yarding method, but some costs can be offset if less road construction is needed.

Two basically different types of harvest will be used in the Crane and Rowan timber sales. Clear-cut harvest (with reserves) will produce an even age stand. The diameter limit harvest is designed to produce a managed stand with two of more age classes. These two types of managed stands together with unharvested areas will be used to create a managed forest that maintains natural disturbance processes and ecological functions and closely resembles natural patterns on the landscape.

### Clear Cut Harvest (with wildlife legacy trees retained)

This harvest method removes the entire stand in one cutting with the exception of some reserve trees. The objective of this method is to create a fast growing even age stand to

## Selection of Harvest Method



maximize wood fiber production. Some trees, about 10 to 15 percent canopy cover, will be retained as a biological legacy to maintain some structural and biological diversity in the new stand. These reserve trees will generally be large defective old trees with little commercial value, and they will not be managed for fiber production in the new stand. Reserve trees will be unevenly distributed, their location depending largely on the capability of the downhill cable yarding systems.

These sites are expected to regenerate naturally, as have all other previously harvested areas in the project area. This stand reinitiation stage is expected to last for 10 to 15 years. The new second growth stand will remain in the stem exclusion stage throughout most of its rotation age, which is expected to be about 90 to 120 years on most sites. Tree density and species composition can be adjusted by precommercial thinning to maintain a fast growing productive stand. Thinning can also minimize the length of time the stand is in the stem exclusion stage by delaying canopy closure. Reserve trees will remain throughout the rotation, however some mortality is expected due to blowdown or other causes.

#### **Diameter Limit Harvest**

The diameter limit harvest is designed to harvest most of the economically valuable trees while leaving most of the trees that are valuable as wildlife habitat. A large portion of the net volume would be harvested while all of the small diameter trees and many of the very large trees would be retained. It will produce a managed stand with two or more age classes and sizes of trees.

On the average, this harvest is designed to leave about half of the original canopy cover. Application of the same diameter limit prescription will have different end results depending on the volume strata and the diameter distribution of trees in the original stand. (Figures 2-7, 2-8, and 2-9). Diameter limit harvest units that are yarded with a helicopter will also have a somewhat different appearance than units yarded with uphill cable systems.

Based on preliminary field measurements, the diameter limit method would harvest, all western hemlock between 16 and 38 inches in diameter, all Alaska cedar greater than 24 inches, and all Sitka spruce greater than 16 inches except for one large decadent Sitka spruce every 10 acres that will be individually marked as leave trees. Trees retained would be: all western hemlock and Sitka spruce less and 16 inches; all Alaska cedar less than 24 inches; all western hemlock greater than 38 inches, and one large decadent Sitka spruce per 10 acres.

The managed second growth stand will, over time, develop multiple age classes and multiple size classes of trees. The stand will consist of the newly regenerated trees; the small diameter leave trees, some of which will release to become crop trees, and the large mostly defective hemlock and spruce reserve trees. On sites exposed to strong windstorms, many of the large old trees will likely blow over resulting in a two age stand that closely resembles the naturally occurring stands that develops after partial blowdowns. On protected sites, where the large old trees will persist, these stands are expected to trend toward an uneven-age condition.

Second growth management of these stands will emphasize production of high quality timber while maintaining ecological functions and stand structural characteristics important for wildlife habitat. Post-harvest treatments, if needed to meet this objective, will be based on the specific stand characteristics identified during stand exams. The tree density and species composition of any size class can be altered by precommercial thinning. Thinning may not be needed on some of these stands since regeneration may not be as dense as is typically the case after clearcut harvest. Recent investigations in partially harvested stands in Southeast Alaska indicate that these stands will not likely go through the stem exclusion stage as do even age stands. Instead, the appearance and structural characteristics are expected to closely resemble

of the understory reinitiation stage throughout most of the rotation.

**Table 3-23** Acres of Proposed Harvest by Clearcut (cc) and Diameter Limit Cut (dl)

	Low Volume		Medium Volume		High Volume		Subtotal		Total
	cc	dl	Cc	dl	cc	dl	cc	dl	
Alt. 2	12	0	117	0	609	0	738	0	738
Alt. 3	0	12	33	83	159	451	192	546	738
Alt. 4	0	16	22	135	138	746	160	896	1056
Alt. 5	7	0	78	3	463	161	548	163	711

Alternative 1 proposed no timber harvest at this time and therefore does not provide an opportunity to bring forest sites under management (table ?). Alternatives 2 and 3 would both bring 710 acres under management. In Alternative 2 all acres would be managed as even-aged stands. For Alternative 3, 198 acres would be managed under even-aged systems while 512 acres would be managed under uneven-aged systems. The greatest number of acres brought under management would occur with Alternative 4. This alternative brings 151 acres under even-aged systems and 888 acres under even-aged systems. The fewest acres would be harvested in Alternative 5. This alternative brings 528 acres under even-aged management and 167 acres under uneven-aged management.

## Threatened, Endangered, and Sensitive Plants

No Threatened or Endangered plants are known to occur on the Tongass National Forest. Twenty-two plant species are designated as Sensitive for the Alaska Region. In addition, ascending moonwort fern (*Botrychium ascendens*), super round wedge moonwort fern (*Botrychium* spp.--yet unnamed), and a variety of netleaf willow (*Salix reticulata* spp. *glabelllicarpa*) were identified as proposed Sensitive Plants in the Forest Plan. Fifteen of these species are known to occur or are suspected of occurring on the Petersburg Ranger District.

The known sensitive plants on the Petersburg Ranger District include Wright filmy fern (*Hymenophyllum wrightii*), Choris bog orchid (*Platanthera chorisiana*), Davy mannagrass (*Glyceria leptostachya*), and loose-flowered bluegrass (*Poa laxiflora*). Wright filmy fern is known from two locations on Mitkof Island where it was found on moist shaded rock ledges. Choris bog orchid has been found in muskegs and forested wetlands at several locations on Kupreanof and Mitkof Islands, and at several locations on the East Side of Kuiu Island from Reed Bay to No Name Bay. It is also present on the mainland near Cape Fanshaw. Davy mannagrass has been found on Mitkof Island at several locations and is common on disturbed wet sites in and around Petersburg. Loose-flowered bluegrass has been found at one location on north Kupreanof Island and at one location on Kuiu Island near No Name Bay. On Kuiu Island it was growing near the high tide line on rock ledges and on Kupreanof Island it was

found along a stream channel.





# **Chapter 4**

## **List of Preparers**





# Chapter 4

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# **Chapter 5**

## **List of Document Recipients**





# Chapter 5

## Listing of Document Recipients

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Adams Alaskan Safaris  
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Alaska Department of Environmental Conservation –Air and Water Quality  
Alaska Department of Fish and Game  
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Narrows Conservation Coalition  
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David Randrup  
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# 5

## List of Document Recipients

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US Environmental Protection Agency – Alaska Operations  
USDI, Fish and Wildlife Service  
USDA Forest Service, S&PF  
USFS Tongass National Forest, Petersburg  
Vanguard Research  
Winifred O. Weber  
Marc Wheeler  
Wrangell Resource Council

# **Chapter 6**

## **Glossary**





# Chapter 6

## Glossary

### Acronyms Used in this Text

<b>ACMP</b>	-----	Alaska Coastal Management Program
<b>ADF&amp;G</b>	-----	Alaska Department of Fish and Game
<b>AHMU</b>	-----	Aquatic Habitat Management Unit
<b>ANSCA</b>	-----	Alaska Native Settlement Act of 1971
<b>ANILCA</b>	-----	Alaska National Interest Lands Conservation Act of 1980
<b>APC</b>	-----	Alaska Pulp Corporation
<b>ASQ</b>	-----	Allowable Sale Quantity
<b>BLM</b>	-----	Bureau of Land Management
<b>BMP</b>	-----	Best Management Practices
<b>CFL</b>	-----	Commercial Forest Land
<b>CFR</b>	-----	Code of Federal Regulations
<b>CMP</b>	-----	Corrugated Metal Pipe
<b>CMPA</b>	-----	Corrugated Metal Pipe Arch
<b>CZMA</b>	-----	Coastal Zone Management Act of 1976
<b>DEIS</b>	-----	Draft Environmental Impact Statement
<b>EIS</b>	-----	Environmental Impact Statement
<b>EPA</b>	-----	Environmental Protection Agency
<b>FEIS</b>	-----	Final Environmental Impact Statement
<b>FPA</b>	-----	Forest Practices Act
<b>FSH</b>	-----	Forest Service Handbook
<b>FSM</b>	-----	Forest Service Manual
<b>GIS</b>	-----	Geographic Information System
<b>GMU</b>	-----	Game Management Unit
<b>IDT</b>	-----	Interdisciplinary Team

# 6 Glossary

<b>KV</b>	Knutsen-Vandenberg Act
<b>LTF</b>	Log Transfer Facility
<b>LUD</b>	Land Use Designation
<b>LWD</b>	Large Woody Debris
<b>MBF</b>	One Thousand Board Feet
<b>MIS</b>	Management Indicator Species
<b>MMBF</b>	One Million Board Feet
<b>MOA</b>	Memorandum of Agreement
<b>NEPA</b>	National Environmental Policy Act of 1969
<b>NFMA</b>	National Forest Management Act
<b>NOI</b>	Notice of Intent
<b>ROD</b>	Record of Decision
<b>ROS</b>	Recreation Opportunity Spectrum
<b>RVD</b>	Recreation Visitor Day
<b>SEIS</b>	Supplemental Environmental Impact Statement
<b>SHPO</b>	State Historic Preservation Officer
<b>TLMP</b>	Tongass Land Management Plan
<b>TRUCS</b>	Tongass Resource Use Cooperative Survey
<b>TTRA</b>	Tongass Timber Reform Act
<b>USDA</b>	United States Department of Agriculture
<b>VCU</b>	Value Comparison Unit
<b>VQO</b>	Visual Quality Objective
<b>WAA</b>	Wildlife Analysis Area

## **Adopted Visual Quality Objectives**

A desired level of scenic quality and diversity of natural features based on physical and sociological characteristics of an area. Refers to the degree of acceptable alterations of the characteristic landscape. The Adopted VQO is given by management direction identified in the Forest Plan.

## **Alaska National Interest Lands Conservation Act (ANILCA)**

Passed by Congress in 1980, this legislation designated 14 national forest wilderness areas in southeast Alaska. In section 705(a) Congress directed that at least \$40,000,000 be made available annually to the Tongass Timber Supply Fund to maintain the timber supply from the Tongass National Forest at a rate of 4.5 billion board feet per decade. Section 810 requires evaluation of subsistence impacts before changing the use of these lands.

## **Alaska Native Claims Settlement Act (ANSCA)**

ANSCA, which became law on December 18, 1971, provides for the settlement of certain

land claims of Alaska natives and for other purposes.

**Alaska Pulp Corporation (APC)**

Previously Alaska Lumber and Pulp Corporation

**Alevin**

Larval salmonoid that has hatched but has not fully absorbed its yolk sac, and generally has not yet emerged from the spawning gravel.

**Allowable Sale Quantity (ASQ)**

ASQ refers to the maximum quantity of timber that may be sold each decade from the Tongass National Forest. This quantity, expressed as a board foot measure, is calculated based on the timber utilization standards specified in the Alaska Regional Guide, the number and type of acres available for timber management, and the intensity of timber management.

**Alpine/Subalpine Habitat**

The habitat found on mountain peaks above 1500 feet in elevation.

**Anadromous Fish**

Fish which mature and spend much of their adult life in the ocean, returning to inland waters to spawn. Salmon and steelhead are examples.

**Arterial Road**

A forest road that provides service to large land areas and usually connects with other arterial roads or public highways.

**Beach Fringe Habitat**

Areas reserved for habitat that occurs from the intertidal zone inland a distance of 1000 feet. This habitat is important to both marine and upland species.

**Benthic Habitat**

Refers to the substrate and organisms on the bottom of marine environments.

**Best Management Practices (BMP)**

Land management methods, measures or practices intended to minimize or reduce water pollution. Usually BMPs are applied as a system of practices rather than a single practice. BMPs are selected on the basis of site-specific conditions that reflect natural background conditions and political, social, economic, and technical feasibility.

**Biodiversity**

Variety of life and its processes including the complexity of species, communities, gene pools, and ecological functions, within the area covered by a land management plan.

**Board Foot**

One board foot is equivalent to a plank one-foot square and one inch thick; it contains 144 cubic inches of wood.

**Cant**

A log that has been partly or wholly cut and is destined for further processing. Tongass National Forest Timber is sometimes cut into cants to prior to export to satisfy laws requiring at least partial processing of national forest timber prior to export.

**Carrying Capacity**

The population that a given area can support without undergoing habitat degradation.

**Clearcut Harvest Method**

A harvest method in which all or nearly all of the trees are removed in one cut. It prepares the



area for a new even-aged stand. As used in the Crane and Rowan Mountain project area, clearcut harvest will retain approximately 10 percent of the canopy as reserve trees.

## **Collector Road**

A forest road that serves smaller land areas than an arterial road. Usually connects forest arterial roads to forest local roads or terminal facilities.

## **Commercial Fishery**

Fish, shellfish, or other fishery resources taken or processed within a designated area for commercial purposes.

## **Commercial Forest Land**

Productive forestland that is producing, or capable of producing, crops of industrial wood and is not withdrawn from timber utilization by statute or administrative regulation. This includes areas suitable for management and generally capable of producing in excess of 20 cubic feet per acre of annual growth, or in excess of 8,000 board feet net volume per acre. It includes accessible and inaccessible areas.

*Standard CFL:* Timber that can be economically harvested with locally available logging systems such as highlead or short-span skyline.

*Nonstandard CFL:* Timber that cannot be harvested with locally available logging systems and would require the use of other logging systems such as helicopter or longspan skyline.

## **Conveyance**

The passing of the title of a property from one owner to another.

## **Cruise**

Refers to the general activity of determining timber volume and quality.

## **Cultural Resources**

Historic or prehistoric objects, sites, buildings, structures, and so on, that result from past human activities.

## **Culturally Modified Tree**

A culturally modified tree is a tree over 50 years old that has been intentionally altered by indigenous people participating in the traditional utilization of the forest.

## **Cumulative Effects**

Cumulative effects are the impacts on the environment resulting from the addition of the incremental impacts of past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-federal) or person undertakes such action. Cumulative impacts can result from individually minor but collectively significant actions occurring over time.

## **Deflection**

The term is used by logging systems engineers to describe the deviation or the lowest point along the arc of a cable once the log load is attached to the cable. If for example a cable yarding system is used to yard logs over a stream channel, the system would be said to have adequate deflection to fully suspend over the stream channel.

## **Deer Winter Range**

A combination of environmental elements that support Sitka black-tailed deer under moderately severe or severe winter conditions. Usually associated with high volume old-growth stands at low elevation and south aspects.

## **Direct Employment**

The jobs that are immediately associated with a given activity. In the case of this Long-Term

Timber Sale, employment in the logging, sawmill, and pulpmill, would be examples of direct employment.

**Dispersed Recreation**

Recreational activities that are not confined to a specific place.

**Distance Zone**

Areas of landscapes denoted by specified distances from the observer (foreground, middleground, and background). Used as a frame of reference in which to discuss landscape characteristics of management activities.

**Draft Environmental Impact Statement (DEIS)**

A statement of environmental effects for a major Federal action released to the public and other agencies for comment and review prior to a final management decision. (Required by Section 102 of the national Environmental Policy Act.)

**Endemic**

Restricted to a particular locality. For example, a particular species or subspecies may occur on only one or a very few islands.

**Estuarine Fringe Habitat**

This habitat type is located within a 1,000-foot zone around an estuary. It is especially important for shorebirds, waterfowl, bald eagles, and other marine-associated species.

**Estuary**

For the purpose of this EIS, estuary refers to the relative flat, intertidal, and upland areas generally found at the heads of bays and mouths of streams. They are predominately mud and grass flats and are unforested except for scattered spruce or cottonwood.

**Even-Aged Management**

The applications of a combination of stand treatments that result in the creation of stands in which trees of essentially the same age grow together. The difference in age between trees forming the main canopy level of a stand usually does not exceed 20 percent. Clear cut, shelterwood, or seed tree harvest methods produce even-age stands.

**Fish Habitat**

The aquatic environment and the immediately surrounding terrestrial environment that, combined, afford the necessary physical, biological support systems required by fish species during the various life stages.

**Fish Habitat Capability**

The carrying capacity or the maximum number of fish the habitat can produce. Habitat capability is measured in smolts for anadromous fish and in numbers of adult fish for resident species.

**Floodplain**

The lowland and relatively flat areas joining inland and coastal waters, including debris cones and flood-prone areas of offshore islands; including, at a minimum, that area subject to a 1 percent (100 year recurrence) or greater chance of flooding in any given year.

**Forest and Rangeland Renewable Resources Planning Act of 1974 (RPA)**

Amended in 1976 by the National Forest Management Act.

**Forest Development Road**

A forest road under the jurisdiction of the Forest Service.

## **Forest Development Transportation System**

Those facilities, forest development roads, trails, and air fields, in the transportation network and under Forest Service jurisdiction.

## **Forest Roads**

A road wholly or partly within, or adjacent to, and serving the National Forest System and is necessary for the protection, administration, and use of the National Forest System and the use and development of its resources.

## **Forested Habitat**

All areas with forest cover. Used in this EIS to represent a general habitat zone.

## **Grabinsiki**

A modified highlead cable logging system.

## **Group Selection Regeneration Method**

Small groups of trees are removed to create new groups of uniform, balanced age classes within the stand. The openings are usually regenerated from seed of the surrounding trees. Age class regulation within groups is usually accomplished by removing unwanted trees when adjacent groups are harvested.

## **Habitat Capability**

The number of healthy animals that a habitat can sustain.

## **Heritage Resources**

The prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places. The term includes artifacts, records, and remains that are related to and located within such properties.

## **High Hazard Soil**

A soil material prone to mass wasting. Soil type, geologic bedding, and slope angle are factors considered when establishing which sites are high hazard.

## **Highlead Cable Logging**

A method of transporting logs to a collecting point (landing) by using a power cable passing through a block fastened off the ground to lift the front ends of the logs off the ground while in transit.

## **Historic Property**

Any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places. The term includes artifacts, records, and remains that are related to and located within such properties.

## **Important Subsistence Use Area**

Important Subsistence Use Areas include the "most-reliable" and "most often hunted" categories from the TRUCS survey and from subsistence survey data from ADF&G, the University of Alaska, and the Forest Service, Region 10. Important use areas include both intensive and extensive use areas for subsistence harvest of deer, furbearers, and salmon.

## **Indirect Employment**

The jobs in service industries that are associated with or support a given activity. In the case of the long-term Timber Sale, indirect employment would include jobs with suppliers of logging and milling equipment.

## **Individual Tree Selection Harvest Method**

Single trees are removed throughout the stand, and new trees are established soon after each harvest occurs. Regeneration is normally from seed of the surrounding trees. Age class



distribution in a stand is regulated by frequent harvests that remove trees from all age classes during each entry.

## **Induced Employment**

The jobs in the service or governmental sectors that result from increased population or purchases associated with given activity, such as the Long-term Sale Contract.

## **Inoperable Timber**

Timber that cannot be harvested by any proven method because of potential resource damage, extremely adverse economic considerations, or physical limitations.

## **Interdisciplinary Team**

Two or more natural resource planners who use relevant information to develop alternative design and comparison for a proposed project. The team insures the integrated use of environmental, social, and economic information is clearly presented so the best decision can be made.

## **Intermediate Stand Treatment**

A stand management treatment that manipulates stand growth, composition, structure, or tree quality. Intermediate treatments include thinning, pruning, release, salvage, and sanitation cutting. These stand treatments do not attempt to obtain new tree regeneration. Some treatments such as salvage cutting or commercial thinning result in the harvest of forest products.

## **Landform**

Features that make up the surface of the earth. Broad features include mountains or large river valleys, and plains. Minor features would include areas such as individual stream channels or hillslopes.

## **Land Use Designation**

A defined area of land specific to which management direction is applied in the Forest Plan.

## **Large Woody Debris (LWD)**

Any piece of relatively stable woody material having a small-end diameter of at least 10 centimeters and a length greater than one meter that intrudes into the stream channel.

## **Local Road**

A forest road that connects terminal facilities with forest collector, forest arterial, or public highways. Usually forest local roads are single purpose transportation facilities and can either be long or short term in nature.

## **Logging Costs**

All costs associated with delivering logs to a milling facility.

## **Log Transfer Facility**

A facility that is used for transferring commercially harvested logs to and from a vessel or log raft. It is wholly or partially constructed in waters of the United States and location and construction are regulated by the 1987 Amendments to the Clean Water Act. Formerly termed terminal transfer facility.

## **Logging Camp**

A temporary facility established to house industry and Forest Service personnel while timber harvest occurs in the area.

## **Mass Failure**

The downslope movement of a block or mass of soil. This usually occurs under conditions of high soil moisture, and does not include individual soil particles displaced as surface erosion.

## **Mass Wasting**

A general term for the dislodgment and down slope transport of soil and rock material by gravity. Mass wasting is often used interchangeably with the term landslide.

## **MBF**

Abbreviation for thousand board feet of timber. One board foot is equivalent to a plank one foot square and one inch thick; it contains 144 cubic inches of wood.

## **MMBF**

Abbreviation for million board feet of timber. One board foot is equivalent to a plank one foot square and one inch thick; it contains 144 cubic inches of wood.

## **Mean Annual Increment**

The total volume of a tree or stand divided by the stand age. Stand volume is usually expressed in cubic feet or board feet per acre per year.

## **Mid Market**

Timber markets have historically been subject to both high and low cycles and will probably do so in the future. In order to incorporate these variations a "normal" or mid-market which represents average long term conditions is developed.

## **Mitigation**

Includes avoiding an impact altogether by not taking a certain action or part of an action; minimizing an impact by limiting the degree or magnitude of an action and its implementation; rectifying the impact by repairing, rehabilitating, or restoring the affected environment; reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action; or compensating for the impact by replacing or providing substitute resources or environments.

## **Multiple Entry**

More than one stand or land treatment activity during a rotation of a stand or area.

## **National Environmental Policy Act of 1969**

An act declaring a National policy to encourage productive harmony between humans and their environment, to promote efforts which will prevent or eliminate damage to the environment and the biosphere and stimulate the health and welfare of humans, to enrich the understanding of the ecological systems and natural resources important to the Nation and to establish a Council on Environmental Quality.

## **National Forest Management Act**

A law passed in 1976 that amends the Forest and Rangeland Renewable Resources Planning Act and requires the preparation of Forest plans.

## **Natural Range of Variability**

The range of variability in climate, vegetative cover, geologic processes, and soil formation influencing a given landscape has over time. Timeframes relative to this document are less than 600 years, not geologic time frames that encompasses far greater variability.

## **"No Action" Alternative**

The most likely condition expected to exist in the future if current management direction would continue unchanged.

## **Non-Forest**

Land that has never supported forests and lands formerly forested but now developed for non-forest uses.

## **Notice of Intent**

The Notice of Intent (NOI) to produce an EIS for the Crane and Rowan Mountain Timber Sales was published in the *Federal Register* in August of 1997.

## **Old-Growth Habitat**

Wildlife habitat managed to maintain old growth forest characteristics through the planning period.

## **Operability**

Timber suitable for harvest and transport to a market.

## **Pond Log Value**

The difference between the end product selling value and manufacturing costs: the value of logs as they are delivered at the mill.

## **Potential Yield**

The potential yield for the next ten years is the maximum harvest that could be planned to achieve the optimum perpetual sustained-yield harvesting level attainable with intensive forestry on regulated areas considering productivity of the land, conventional logging technology, standard cultural treatments and interrelationships with other resources uses and the environment.

## **Precommercial Thinning**

An intermediate stand treatment used to remove immature or undesirable trees, and to reduce competition and promote diameter growth on the remaining trees. Precommercial thinning is also used to extend the time before canopy closure shades out shrubs and forbs.

## **Recreation Opportunity Spectrum (ROS)**

A system for planning and managing recreation resources that categorizes recreation opportunities into the following seven classes:

*Primitive:* A natural environment of fairly large size. Interaction between users is minimal. The area is managed to be essentially free from evidence of human-induced restrictions and controls.

*Semi-Primitive Motorized:* A natural or natural-appearing environment of moderate to large size. Interaction between users is low, but there is often evidence of other users. The area is managed to minimize on-site controls and restrictions. Local roads used for other resource management activities may be present.

*Semi-primitive Non-Motorized:* A natural or natural-appearing environment of moderate to large size. Concentration of users is low, but there is often evidence of other users. The area is managed to minimize on-site controls and restrictions. Use of local roads for recreational purposes is not allowed.

*Roaded Natural:* A natural-appearing environment with moderate evidence of the sights and sounds of man. Such evidence usually harmonizes with the natural environment. Interaction between users may be moderate to high with evidence of other users prevalent. Motorized use is allowed.

*Roaded Modified:* A natural environment that has been substantially modified particularly by vegetative manipulation. There is strong evidence of roads and/or highways. Frequency of contact is low to moderate.

*Rural:* A natural environment that has been substantially modified by development of structures, vegetative manipulation. Structures are readily apparent and may range from scattered to small dominant clusters. Sights and sounds of humans are readily evident, and the interaction between users is often moderate to high.



*Urban:* Urbanized environment with dominant structures, traffic lights, and paved streets. High concentration of people, and sights and sounds of human activity are acceptable.

## **Recreation Places**

Identified geographical areas having one or more physical characteristics that are particularly attractive to people in recreation activities. They may be beaches, streamside or roadside areas, trail corridors, hunting areas of the immediate area surrounding a lake, cabin site, or campground.

## **Redd**

Nest made in gravel, consisting of a depression hydraulically dug by a fish for egg deposition and then refilled with gravel.

## **Reserves**

A general term for an area of land recognized for, and managed to preserve or maintain, specific natural features. Wilderness is one common example. In the context of wildlife or fish habitat management, or biological diversity, an area set aside for the maintenance and perpetuation of its habitat or ecosystem features.

## **Right-of-way**

The privilege which a person or persons may have of passing over the land of another.

## **Roads, Forest Development (or Specified)**

A road, including related transportation facilities and appurtenances, shown on the Sale Area Map and listed in the Timber Sale Contract.

## **Roads, Temporary (or Spur)**

Any short-lived road not intended to be a part of the forest development transportation system and not necessary for future resource management. After a temporary road has served its purpose, the timber sale operator will remove bridges and culverts, eliminate ditches, outslope roadbed, remove ruts and berms, effectively block the road to normal vehicular traffic, and build cross ditches and waterbars.

## **Rotation**

The planned number of years (approximately 100 years in Alaska) between the time that a forest stand is regenerated and its final cutting at a specified stage of maturity.

## **RPA**

Forest and Rangeland Renewable Resources Planning Act of 1974.

## **Salvage Cutting**

Cutting primarily to utilize dead/down trees will not be marketable if left in the stand until the next scheduled harvest. Salvage sales must contain more than 50 percent by volume of dead, insect infested, or windthrown timber.

## **Sawlog**

A log considered suitable in size and quality for producing sawn timber.

## **Section 810**

Section 810 of the Alaska National Interest Lands Conservation Act (ANICLA) requires evaluation of Forest management impacts on subsistence uses and determinations regarding their significance. Reasonable steps to minimize adverse impacts upon subsistence uses and resources are provided for by the forest-wide standards and guidelines for subsistence as well as related standards and guidelines for riparian areas, fish, and wildlife.

**Seed Tree Regeneration Method**

A regeneration method where trees are left on site to provide seed to establish the new stand. Seed trees usually have good form, produce seed, are of the desired species, and are spaced to ensure adequate seed distribution. After the new seedlings are established the seed trees can be left or harvested.

**Shelterwood Regeneration Method**

This regeneration method provides overstory shelter so young seedlings can become established. The seedlings can originate from planting or natural regeneration. Shelterwood trees are usually removed after the seedlings are established.

**Silviculture**

The science and art of growing and tending crops of forest trees to attain the desired level of marketable and unmarketable products.

**Silviculture Prescription**

A written technical document, that provides detailed direction for manipulating vegetation and monitoring treatments. A prescription is prepared after a preferred treatment alternative has been selected, but before the project is implemented. A prescription is prepared by a silviculturist to achieve the objectives established by the interdisciplinary team.

**Slash**

Debris left over after a logging operation, i.e., limbs, bark, broken pieces of logs.

**Soil Hazard Areas**

Mapped areas within which various soil hazards may be encountered. Hazards include mass failures and high sediment production during road construction.

**Spawning Area**

The available area in a stream course, which is suitable for the deposition and incubation of salmon or trout, eggs.

**Species Diversity**

The number of different species occurring in a location or under a similar environmental condition.

**Specified Road**

Those roads including related transportation facilities listed in timber sale contracts for construction or reconstruction by the timber purchaser in accordance with locations and specifications provided by the Forest Service. Those Forest Development roads planned for recurrent land management uses and for which the timber sale contract specified the location, standards, and specifications. Specified roads are sometimes referred to as permanent roads.

**State Historic Preservation Officer (SHIPO)**

The official appointed or designated pursuant to Section 101(b)(1) of the National Historic Preservation Act of 1966, as amended, to administer the State Historic Preservation Program.

**Stream Classification System**

A means to categorize stream channels based on their fish production values. There are three stream classes on the Tongass National Forest. They are:

*Class I:* Streams with anadromous (fish ascending from oceans to breed in freshwater) or adfluvial (fish ascending from freshwater lakes to breed in streams) lake and stream fish habitat. Also included is the habitat upstream from migration barriers known to be reasonable enhancement opportunities for anadromous fish and habitat with high value resident sport fish populations.

*Class II:* Streams with resident fish populations and generally steep (often 6-15 percent) gradient (can also include streams from 0-5 percent gradient where no anadromous fish occur). These populations have limited sport fisheries values. These streams generally occur upstream of migration barriers or are steep gradient streams with other habitat features that preclude anadromous fish use.

*Class III:* Streams with no fish populations but have potential water quality influence on the downstream aquatic habitat.

*Class IV:* Other intermittent, ephemeral, and small perennial streams with no fish populations and insufficient flow or sediment transport capabilities to have and immediate influence on downstream water quality or fish habitat.

## **Streamside Riparian**

The area including a stream channel, lake, or estuary bed, the water itself, and the plants that grow in the water and on the land next to the water.

## **Stumpage**

The value of timber as it stands uncut in terms of amount of value per thousand board feet.

## **Subsistence**

The term "subsistence uses" means the customary and traditional uses by rural Alaska residents of wild renewable resources for direct, personal, or family consumption as food, shelter, fuel, clothing, tools, or transportation; for the making and selling of handicraft articles out of non-edible byproducts of fish and wildlife resources taken for personal or family consumption; and for barter, or sharing for personal or family consumption; and for customary trade.

## **Temporary Road**

Roads constructed for a single purpose and short-term use. Once use of the road has been completed, it is obliterated, and the land it occupied is returned to production.

## **Thousand Board Foot Measure**

A method of timber measurement in which the unit is equivalent to 1,000 square feet of lumber one inch thick. It can be abbreviated as MBF.

## **Threshold of Concern**

The point or level of activity beyond which an undesirable environmental response is more likely to occur.

## **Timtype**

Timber type maps provide complete coverage of the Tongass National Forest. These maps were completed in 1978 and updated for the forest inventory between 1982 and 1984. In October, 1993, the timber type map information, along with the forest inventory, was identified as the source for the timber resource information needed for the Revised Forest Plan. TIMTYPE is the digitized timber type information stored in the computerized Geographic Information System (GIS).

## **Tongass Land Management Plan (TLMP)**

The land allocation plan for the Tongass National Forest which serves to direct and coordinate further planning on the Forest as well as the uses carried on within the Forest on a day-to-day basis. TLMP provides management direction for a period of ten years.

## **Tongass Resource Use Cooperative Study (TRUCS)**

A compilation of subsistence data for evaluating the effects of the Forest Service's action contemplated in the revision of the regional Tongass Land Management Plan.

## **Transportation Network**

All existing and proposed roads, trails, air fields, and other transportation facilities wholly or



partly within or adjacent to and serving the National Forests and other areas administered by the Forest Service or intermingled private lands.

### **Uneven-aged Stand Management**

A forest stand management strategy which results in trees of at least 3-tree age classes. Relatively frequent harvest entries remove mature and immature trees either singly (individual tree selection) or in groups (group selection). Natural regeneration usually occurs soon after each harvest entry. Intermediate stand treatments are usually performed when the harvest entry occurs. Stand regulation or management is accomplished by manipulating stand density, stand structure, species composition, re-entry periods, and maximum tree age. Biological diversity is generally greater within an uneven-aged stand than within an even-aged stand.

### **Utility Logs**

Those logs, which do not meet sawlog grade, but are suitable for production of firm useable pulp chips.

### **V-Notch**

A relatively narrow, steep, V-shaped stream channel generally on steep, mountainous terrain.

### **Value Comparison Unit (VCU)**

A distinct geographic area that generally encompasses a drainage basin containing one or more large stream systems. Boundaries usually follow easily recognizable watershed divides. These units were established on the Tongass National Forest to provide a common set of areas for which resource inventories could be conducted and resource value interpretations made.

### **Visual Priority Travel Rout or Use Area**

Viewing locations from which scenic impacts are assessed, typically defining where the greatest concern for scenic quality exists.

### **Visual Quality Objective (VQO)**

A desired level of scenic quality and diversity of natural features based on physical and sociological characteristics of an area. Refers to the degree if acceptable alterations of the characteristic landscape.

*Inventory VQO:* Derived through application of the USDA Visual Management System.

Uses three elements to determine the inventory: Sensitivity levels, distance zones, and landscape variety class. Provides a benchmark and illustrates the optimum objective based on current use patterns and sensitivity.

*Adopted VQO:* The VQO to be achieved as a result of management direction identified in the approved forest plan. Adopted VQO's represent the visual resource objective for the Forest Land Management Plan period, normally 10 years (FSH 2309.22, R10 Landscape Management Handbook).

*Preservation:* Management activities are generally not allowed in this setting. The landscape is allowed to evolve naturally.

*Retention:* Management activities are not evident to the casual forest visitor.

*Partial Retention:* Management activities may be evident, but are subordinate to the characteristic landscape.

*Modification:* Management activities may dominate the characteristic landscape but will, at the same time, use naturally established form, line, color, and texture. It should appear as a natural occurrence when viewed as middleground (1/4 to 5 miles from viewer).

*Maximum Modification:* Management activities may dominate the characteristic landscape, but should appear as a natural occurrence when viewed as background.

**Viewshed**

A term used by landscape architects to infer a geographically distinct landscape that people can view or perceive as a single unit.

**Volume**

Stand volume based on standing net board feet per acres by Scribner Rule.

**Volume Class**

Average timber stand volume, given as thousand board feet per acre. The volume classes used in this EIS are: 8 to 20, 20 to 30, 30 to 50, and 50+ MBF/acre.

**Volume Strata**

Division of timber volume derived from the interpreted timber type data layer (TIMTYP) and the common land unit data layer (CLU). Three volume strata (low, medium, and high) are recognized in the Forest Plan.

**Watershed**

The area that contributes water to a drainage or stream.

**Watershed Analysis**

A systematic procedure for characterizing and evaluating watershed response. Factors likely to influence watershed response are used to indicate anticipated effects. Past, present, and proposed actions are considered.

**Wetland**

Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions.

**Wilderness**

Any large tract of land uncultivated and uninhabited by human beings, where the earth and its biotic community is untrammelled by humans, where humans are the visitors who do not remain.

**Wildlife Habitat**

The locality where the species may be found and where all essentials for its development and existence are present.

**Windthrow (Blowdown)**

Trees uprooted or snapped off by the wind. There are generally three types of windthrow – endemic where individual trees are blown over; catastrophic where major windstorms can blowdown hundreds of acres; and management related where the clearing of trees in an area make the adjacent trees more vulnerable to blowdown.

# **Chapter 7**

## **Literature Cited**





# Chapter 7

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# **Appendix A**





# **Appendix A**

## **Reasons for Scheduling the Environmental Analysis of the Crane and Rowan Mountain Timber Harvest**

### **I. INTRODUCTION**

The following analysis was prepared by the Stikine Area as part of the Position Statement to address whether or not the purpose and need of harvesting 23 MMBF of timber from the Crane and Rowan Mountain Creek Project Area is a valid and reasonable objective. It has been updated to reflect the changes made by the revised Forest Plan (1997).

To arrive at this volume, it was necessary to answer four different questions. First, how much timber should the Tongass National Forest provide? Second, in the Tongass-wide timber sale program, how much should be produced from the Stikine Area? How should individual timber sale projects be scheduled to achieve the Stikine Area timber sale program objectives? Finally, how does the Crane and Rowan Mountain Project Area fit into that schedule?

### **II. HOW MUCH TIMBER SHOULD BE PRODUCED ON THE TONGASS NATIONAL FOREST?**

There are two sources, the Tongass Land and Resource Management Plan (1997) and the Tongass Timber Reform Act (TTRA), that help identifying a Tongass-wide timber sale

program level. The values used to arrive at the demand for timber are based on the information from the Forest Plan, Appendix M.

## **Revised Tongass Land Management Plan (1997)**

The main goal for the Tongass Land and Resource Management Plan (1997) is to sustain the diversity, function, and productivity of ecosystems. The desired conditions include natural environments which will provide the essential old-growth forests to sustain viable fish and wildlife populations for continued commercial, sport, and subsistence use and provide outstanding scenery for Forest visitors. The desired condition includes the availability of sawtimber and other wood products on a sustained-yield basis economically efficient to seek to meet the local timber industry demand.

The Allowable Sale Quantity is the maximum quantity of timber that can be harvested on an entire Forest in a decade (36 CFR 219.3). The Revised Forest Plan estimates the average annual Allowable Sale Quantity at 267 MMBF (65 MMCF) of sawtimber and utility volume (Forest Plan, Appendix L).

## **Tongass Timber Reform Act (1990)**

The Tongass Timber Reform Act (TTRA) was enacted modifying management of the Tongass National Forest. The Act was incorporated during the revision of the Forest Plan. TTRA requires the Forest Service to "the extent consistent with providing for multiple use and sustained yield of all renewable forest resources, seek to provide a supply of timber from the Tongass National Forest which (1) meets the annual market demand for timber from such forest and (2) meets the market demand from such forest for each planning cycle." The courts have held that this provision of TTRA does not present an absolute requirement for the Forest Service to offer a particular volume of timber for harvest. This requirement helps to identify a timber harvest program level that could be offered subject to the legal requirements of this and other sections of TTRA and several other laws and the Forest Plan.

## **Estimation of Demand**

Demand can be estimated by looking at either installed mill capacity or actual historical consumption. Installed mill capacity provides a short term theoretical maximum estimate. Mill capacity is fixed unless facilities expand or new facilities are built. Because some mill capacity may not be presently used due to market demand for the finished product or other conditions, this is a theoretical maximum. Actual consumption is a limited estimate of demand based on historical market conditions. To the extent market conditions change from historical conditions, the actual demand may change. Despite these limitations, these methods provide the best available estimates.



Demand estimates using both installed mill capacity and actual demand are from the Revised Forest Plan. Demand for sawtimber and utility wood based on installed capacity of timber processors in FY 1997 was 495 MMBF with the Wrangell Mill (Forest Plan FEIS, Appendix M). The Wrangell sawmill is currently closed but included in the analysis to reflect potential reopening.

Average annual demand based on estimated consumption ranges from a current possible low of 65 MMBF to an estimated high of 206 MMBF in 2010 (Forest Plan FEIS, Appendix M). This estimate includes consumption by the Wrangell mill. This projection is based on the consideration of changes in the international wood products market, changes in the structure of the Alaska forest products industry, and a continuing changes in the Pacific Northwest and Canada. This projection assumes that the lower grade material previously used for pulp can be exported.

### **III. HOW MUCH OF THE TONGASS WIDE TIMBER SALE VOLUME SHOULD BE PRODUCED ON THE STIKINE AREA?**

Historically, the Stikine's portion of Tongass National Forest timber sale program was 108 MMBF/Year (Tongass Land Management Plan, 1979). Approximately 40 MMBF was scheduled to meet a portion of the Chatham and Stikine Areas' contract commitment for the Alaska Pulp Corporation long-term timber sale (104 MMBF/Year), and 68 MMBF was available for the independent timber sale program.

The Allowable Sale Quantity is the maximum volume that can be harvested, not a future sale level projection and does not reflect all the influences such as market conditions or other resource constraints. The average annual ASQ assigned by the Revised Forest Plan to the Stikine Area is 95 MMBF (23 MMCF). Of the 95 MMBF, 77 MMBF will be on lands that use standard logging system technology. The yearly quantity offered may be more or less than the average for the decade.

### **IV. HOW SHOULD INDIVIDUAL TIMBER SALE PROJECTS BE SCHEDULED TO ACHIEVE THE STIKINE AREA TIMBER SALE PROGRAM OBJECTIVES?**

The Stikine Area, along with the Ketchikan and Chatham Areas of the Tongass National Forest, plan timber sale preparation based on a ten year period. This schedule allows the necessary time to complete preliminary analysis, resource inventories, environmental documentation, layout, appraisal, offer and award.

The schedule is reviewed annually. (See Stikine Area Ten Year Sale Schedule, attached.)

The schedule lists both the NEPA analyses and sale offerings necessary to achieve a program level of 77 MMBF per year over a ten year period along with the dates for key milestones or "gates" in the sale preparation process. A project completes Gate 2 when environmental analysis is conducted and a decision is signed. Gate 3 represents sale layout, and Gate 5 is the advertisement of the timber sale. An environmental document may cover one or more sales in the ten-year sale plan.

The Stikine Area is approximately 3.8 million acres subdivided into 139 Value Comparison Units (VCUs) which generally represent distinct watersheds. Within each VCU, specific Land Use Designations (LUDs) are identified. Three LUDs designated suitable forest lands as available for timber harvest:

## LUD

## Goals

Scenic Viewshed	To provide a sustained yield of timber and a mix of resource activities while minimizing the visibility of developments as seen from the Visual Priority Travel and Use Areas.
Modified Landscape	To provide a sustained yield of timber and a mix of resource activities while minimizing the visibility of developments in the foreground.
Timber Production	To maintain and promote industrial wood production from suitable timber lands, providing a continuous supply of wood to meet society's needs.

Of the areas that are planned for entry, a relatively small percentage of the total volume available for harvest is scheduled. This strategy for timber harvest scheduling spreads the harvest through time and space to reduce total environmental impacts. For example, the effects to water quality if 50% of a watershed is harvested at once are different than five entries that harvest 10% of the watershed every ten years. By allowing time for recovery and causing less ground disturbance, water quality is less likely to be as affected, but both approaches would harvest the same amount of volume.

The current sale schedule represents one solution to meet program objectives; other solutions are feasible. The timber harvest program does respond to allocating harvest across available lands to balance the need to mitigate impacts and leaves some areas unscheduled to maintain future options.

## **V. HOW DOES THE CRANE AND ROWAN MOUNTAIN PROJECT FIT INTO THE SCHEDULE?**

The Crane and Rowan Mountain Project area is located on the north end of Kuiu Island. The area is allocated Land Use Designations of Timber Production, Semi-Remote Recreation, Wild, Scenic, or Recreation Rivers, and Old-Growth Habitat.

The current ten year timber schedule was updated in October 1997 and provides for 88 MMBF of timber volume to be offered in Fiscal Year 1999. Part of this volume will be obtained from the Crane and Rowan Mountain Project Area. The volume is scheduled to be sold in two sales. The number and size of sales may vary if there are opportunities for smaller offerings. This will be decided during the update of the sale schedule after the Crane and Rowan Mountain Record of Decision is completed.

## **VI. CONCLUSION**

Considering the timber harvest program objectives for the Tongass National Forest, and the Stikine Area's contribution to those program objectives, the proposed harvest of 23 MMBF from the Crane and Rowan Mountain Project Area is reasonable and valid. This volume will contribute to meeting the average annual volume of 77 MMBF; if any less volume is harvested in the Crane and Rowan Mountain Project Area, either the analysis of another area would need to be completed before scheduled or the volume of an ongoing analysis would need to increase.





# **Appendix B**





# Appendix B

## Unit Plans and Road Management Objectives

### Unit Plan Summaries

#### Introduction

Unit plan summaries are intended to serve a dual purpose: (1) to disclose the site specific elements of the design unique to the unit in the NEPA process, and (2) to provide sufficient documentation so that timber sale layout teams can easily understand the unit's objectives as planned by the interdisciplinary team.

#### Planning Process

Unit planning is accomplished with an interdisciplinary process. The process is interactive in nature in that a preliminary plan is developed which is subjected to the scrutiny of both Forest Service and other governmental agencies as well as interested individuals from the general public. Information gathered through this public involvement process is used to modify the original proposal to better address the collective concerns and objectives. Summaries of the results of the unit planning process are documented on the unit plan cards displayed below.

Unit plan summaries are intended to capture the site specific elements of unit design unique to the individual unit. A timber harvest unit proposal results from an interdisciplinary planning process that must consider the resource objectives of all individuals concerned. The working documentation for a single harvest unit proposal can include a considerable quantity of working maps, resource surveys, logging skyline analysis, landscape management computer designs, and other related information. The unit plans presented here are a summarization of this larger body of supporting documentation. As such, it should be realized that each unit plan summary does not and cannot display all available supporting information. To fully see the total picture within which a unit design evolved, one must look at all of the supporting documentation.

Elements of design that are common to all units have been grouped under separate headings and listed below before the unit plan summaries.

## **Unit Plan Summary Format**

Unit plan summaries are presented in three sections:

### **The Heading**

The heading includes unit number and pertinent geographical information

### **Resource Concerns/Opportunities - Unit Management Objectives**

This section provides site specific information unique to the unit and the objectives identified to address the resource concerns and opportunities that focused the design process. The absence of a resource indicates that the resource was not a concern in the unit.

### **Implementation Activities**

This section provides a summary of site specific resource information unique to the area associated with the unit that was important and necessary for the design.

### **Transportation System**

This section describes the planned access to the unit, in particular, whether the roads required will be specified forest development roads or temporary spurs.

### **Silvicultural Prescription Summary**

This section provides a summary of the silvicultural prescription developed to achieve the land management objective.

### **Unit Design**

This section describes the site-specific features of the unit design that were developed by the IDT to address the identified concerns. Some elements of design that are not unique but must be considered for all units are not included in the summaries. They are grouped into the following categories and described below:

- Laws and Regulations
- Timber Sale Contract Provisions
- Ecosystem Management
- Logging Engineering Requirements
- Road Engineering Requirements

## **Elements Common to All Units**

### **Laws and Regulations**

All laws and regulations pertinent to the management of the National Forest System are considered in the design of harvest units. While not listed on each in the summaries for each unit plan they provide the framework for the interdisciplinary process and the overall guidance for developing the plans.

**Timber Sale Contract Provisions**

A contract provision that will be used to implement the harvest proposal deal with riparian stream habitat protection requirements of the Tongass Timber Reform Act of 1990 and Forest Plan Standards and Guidelines and is copied below:

CT6.51# - Streamcourse Protection 9/97. Streamcourses or associated Streamcourse Protection zones subject to this provision are designated on the Sale Area Map and marked on the ground using Blue/White, Red/White, Orange/White or Green/White striped ribbon. Unless waived or agreed otherwise in writing, such Streamcourses are subject to the following:

(a) Included Timber designated for removal along streamcourses marked on the ground with Blue/White or Red/White or Orange/White striped ribbon shall be directionally felled away from streams. Felling may be accomplished by wedging, jacking, lining, or otherwise pulling when necessary to meet this directional requirement. Blue/White flagged Streamcourses are shown on the Sale Area Map with the symbol "a", Red/White flagged Streamcourses are shown on the Sale Area Map with the symbol "b" and Orange/White flagged Streamcourses are shown on the Sale Area Map with the symbol "c". Trees, logs or other products shall not be hauled or yarded across streamcourses without prior written approval of Forest Service. Such trees, logs or other products hauled or yarded across streamcourses shall meet the suspension requirements in CT6.42#. If trees or portions of trees are inadvertently felled in or otherwise placed in Streamcourses as a result of Purchasers operations, Forest Service may designate such material to be removed or to remain unyarded in the streamcourse. Trees or portions of trees to be left in streamcourses shall be clearly identified by Forest Service prior to yarding.

(b) Purchaser's operations shall be conducted to prevent debris from entering Streamcourses, except as authorized under paragraph (c). In event Purchaser causes debris to enter Streamcourses other than those authorized under paragraph (c) in amounts which may adversely effect the natural flow of the stream, water quality or fishery resource, Purchaser shall remove such debris as soon as practicable, but not to exceed 48 hours, and in an agreed manner that will cause the least disturbance to Streamcourses.

(c) Included Timber designated for removal along streamcourses marked on the ground with Green/White striped ribbon shall, in so far as practical, be felled and yarded away from streamcourses. Green and White flagged Streamcourses are shown on the Sale Area Map with the symbol "d". Trees that can not be felled away from the streamcourse will be felled to bridge the stream provided those trees will be removed during the same operating season. Trees felled to bridge streamcourses shall be bucked, limbed and topped away from the streamcourse and its banks.

(d) Culverts or bridges shall be required on Temporary Roads at all points where it is necessary to cross Streamcourses identified in (a). Such facilities shall be of sufficient size and design and installed in a manner to provide unobstructed flow of water and to minimize damage to Streamcourses.



(e) Wheeled or track-laying equipment shall not be operated in Streamcourses except at crossings designated by Forest Service or as essential to construction or removal of culverts and bridges.

(f) Flow in Streamcourses may be temporarily diverted only if such diversion is necessary for Purchaser's planned construction and Forest Service gives written authorization. Such flow shall be restored to the natural course as soon as practicable and in any event prior to a major storm runoff period or runoff season.

(g) Purchaser's operations are to be conducted according to Best Management Practices as defined in Forest Service Handbook 2509.22.

It was felt, by the IDT, that the "full suspension" requirement needs further clarification to avoid confusion during the implementation process. Yarding across streams described is normally avoided by locating divisions between cable yarding settings (splitlines) on the streamcourses so that trees will be yarded away from streamcourses. Because of the meandering nature of some streamcourses it is recognized that occasional logs may be yarded across the streamcourse during the normal yarding operation.

It is also understood that where cable yarding splitlines are designed to minimize yarding of logs across streamcourses, non-merchantable trees will be left standing to help maintain streambank stability and occasionally merchantable trees may be left standing to achieve the objective of providing for biological diversity and reserve tree retention needed for wildlife.

### **Ecosystem Management**

Ecosystem management is an evolving concept that has recently been addressed by the Forest Service on a nationwide basis. Region 10 has developed an implementation strategy that embodies the concepts formalized by the Chief of the Forest Service. The goal is to provide silvicultural prescriptions for each proposed harvest unit that consider the larger ecosystem context within which the unit lays. As such, the individual unit plans will be used as a diagnostic tool for the development of silvicultural prescriptions prior to individual unit harvest. The silvicultural prescriptions will site specifically depict pre and post harvest silvicultural treatments of stands as they relate to ecosystem management strategies.

### **Logging Engineering Requirements**

It is assumed that unless otherwise stated in the unit plan design, Partial suspension is the yarding objective desired. All units are designed to meet at least the objective of partial suspension of logs when utilizing cable-logging systems. This includes the use of highlead systems where partial suspension can be achieved for only relatively short distances. Furthermore, unless otherwise stated the logging system is assumed to be the cheapest system that will meet this objective. This is normally a running skyline.

### **Road Engineering Requirements**

Special designs for crossing moderate and steep-sloped Class I streams are assumed for all roads. These are streams with a high risk of blocking migration of anadromous fish. Either

bridges or special designed culvert pipes will be used. Culverts will be oversized squash pipes buried below the natural stream bottom, be fitted with baffles to hold stream gravel, and be sufficiently wide to cause no restriction of the stream bottom. See the road cards for further details.

## Road Management Objectives

### Purpose and Use

The road management objectives (RMO's) presented in this appendix establish the intended purpose, and display design, maintenance, and operation criteria (as per FSH 7709.55), for each road on the haul route of the timber sale. The presentation includes three sections for each road. The first section, which includes general design criteria and elements, maintenance, and operation criteria, is part of a permanent database that will be updated periodically as access needs, issues, and budgets change. The second section is a detailed listing of site specific design criteria that will be used extensively during design, construction, and initial monitoring of the new road construction proposed in this project. The third is a map showing the location of proposed new construction and identifying areas discussed in the site specific design criteria section.

### General Design Criteria

The general design criteria provide various descriptors of the type of road, and the intended purpose and future use of the road. From this information, the maintenance and operation criteria can be developed. This information is critical for determining whether a Corps of Engineer's permit will be required for segments of road crossing wetlands. Roads built solely for silvicultural purposes do not require these permits.

### Maintenance Criteria

The maintenance criteria include a discussion of how the road is to be maintained, centering on three strategies.

- **Active:** provide frequent cleanout of ditches and catchbasins to assure controlled drainage. Control roadside brush to maintain sight distance. Grade as needed to maintain crown and running surface.
- **Storm Proof:** provide waterbars, rolling dips, outsloping, etc., to assure controlled runoff until any needed maintenance can be performed on the primary drainage system. Control roadside brush to maintain passage.
- **Storage:** remove or bypass all drainage structures to restore natural drainage patterns, add waterbars as needed to control runoff, re-vegetate.

The **active** maintenance strategy is primarily intended to be applied to roads open and maintained for travel by a prudent driver in a standard passenger car. User comfort and

convenience are not considered priorities. These roads are assigned Maintenance Level 3. The active maintenance strategy will also at times be applied to roads intended only for use by high clearance vehicles, or Maintenance Level 2 roads. This will usually be the case when log haul is expected in the near future.

An intermediate maintenance strategy is to **stormproof** the road by providing roadway features such as driveable waterbars, and outsloping to controll runoff in case the primary drainage system of culverts and ditches is overwhelmed during a storm event. Each culvert will be evaluated as to where the water would go if the culvert were to fail to carry the high flow. A waterbar or outslope at this location will minimize the potential of erosion of long stretches of ditchline or roadway. This is intended to be the primary maintenance strategy applied to roads assigned Maintenance Level 2.

**Storage** is intended to be the primary maintenance strategy applied on intermittent use roads during their closure cycle. Road storage is defined in FSH 5409.17 as “the process/action of closing a road to vehicle traffic and placing it in a condition that requires minimum maintenance to protect the environment and preserve the facility for future use”. In this strategy, bridges and culverts on live streams are completely removed to restore natural drainage patterns. Cross drains and ditch relief culverts will be bypassed with deep waterbars but left in place to minimize the cost of reusing these roads in the future. Due to the isolated nature of the road system, which makes maintenance costly and difficult, and their infrequency of use, storage is the most appropriate strategy for these roads. Maintenance Level 1, closure and basic custodial maintenance, is assigned.

The interdisciplinary team went through a process defining road management considerations leading to the maintenance strategy to be applied to each road in the project area. The process is captured in the flow chart presented below. The map titled “Road Management Objectives: Maintenance Strategy” shows the desired future condition of each road in the project area as a result of following the displayed process. These objectives can be compared to the current condition of the roads shown on the alternative maps. The work needed to meet the objectives can be accomplished on the roads along the haul route in this timber sale. Work needed on other roads to meet the desired objectives will be scheduled as funding allows.

## **Operation Criteria**

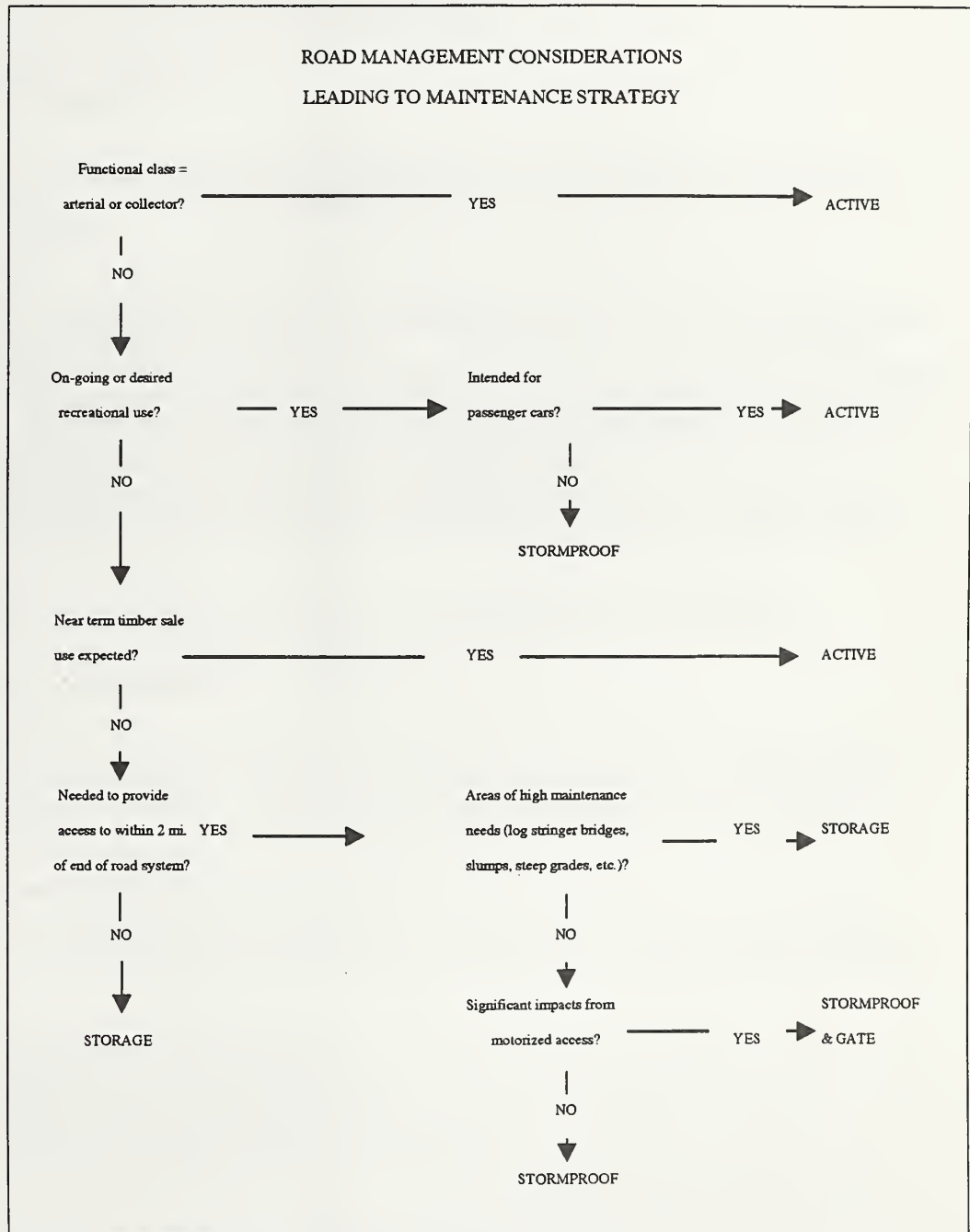
The operation criteria include a presentation of each of the five traffic management strategies identified in FSH 7731 (encourage, accept, discourage, prohibit, and eliminate) to be applied to different traffic classes on each road. The traffic management narrative describes what actions will be taken to apply each strategy. For example, if the strategy “eliminate” is prescribed for standard passenger and high clearance vehicles, the narrative describes the method to accomplish this, such as removal of stream crossing structures, gating, etc.

## **Site Specific Design Criteria**

The site specific design criteria include road location objective, wetland information, erosion control and rock pit BMP's, and key stream crossing data. The road location discussion documents why the road is proposed in a specific location, control points, and alternative routes considered (if any). A main location objective is always to avoid crossing wetlands,



however at times, it is necessary to minimize the total impact of a road. These areas are discussed, documenting areas of mapped wetlands and why the road is located across these areas. All fish streams are identified, as well as non-fish streams with sufficient flow to require a 48" or larger culvert. The stream crossing information describes the stream in enough detail to lead to a preliminary crossing structure recommendation and for a reviewer to evaluate the adequacy of the proposed structure.



# B Appendix

# CRANE and ROWAN MOUNTAIN UNIT PLAN

**VCU-UNIT.ALT** 399-13.2

Management Prescription: Timber Production

Acres Even Aged: 64

Natural Stand Condition: Understory Reinitiation/Oldgrowth

Acres 2-Aged: 0

Desired Future Condition Even aged

Acres Uneven Aged 0

Volume(MBF) 2150.4

USGS 1/4 QUAD MAP #: PTA D1 SW

Aerial Photo: 77

Flight# 6

Photo#

93

## **I. RESOURCE CONCERNS/OPPORTUNITIES - UNIT MANAGEMENT OBJECTIVES**

Class II stream east of unit - maintain riparian buffer.  
Two Class III streams in unit - maintain streambank stability.  
Class IV within unit.  
South winds predominate - incorporate disturbance ecology principles.  
Possible unstable soils on upper slopes - maintain slope stability.  
Upper portion of unit visible from Saginaw Bay - Meet VQO of Modification

## **II. IMPLEMENTATION ACTIVITIES**

### **A. ECOSYSTEMS MANAGEMENT:**

#### **1. Vegetation:**

Southern part of unit is old growth. Central and south part of unit is understory reinitiation. Class III stream protected by buffer in northern part of unit is old landslide track originating from steep ground above unit and is understory reinitiation with high spruce component.

#### **2. Aquatic Habitat:**

Class I/II: No commercial harvest within 100 feet. No programmed commercial harvest within the RMA. Manage an appropriate distance beyond the no harvest zone to provide windfirmness. (BMP 12.6 Riparian Area Designation and Protection; BMP 13.16 Stream Channel Protection.)

Class III: No programmed commercial timber harvest within the V-notch (side-slope break). Manage an appropriate distance beyond the slope break for windfirmness. (BMP 12.6 Riparian Area Designation and Protection; BMP 13.16 Stream Channel Protection) Southeast winds predominate requiring special attention on the south sides of the V-notches. Both streams within the unit are in the High Gradient Contained Process Group. Manage the area within 120 feet of the V-notch to provide for windfirmness. Windthrow has been recorded in the area from SE winds.

Class IV: Field reconnaissance has identified the potential for one or two small Class IV streams in the unit. Provide adequate deflection to minimize soil disturbance by using tailtrees on ridge adjacent to the stream. Partially suspend logs over the stream. (BMP 13.16 Stream Channel Protection)

#### **3. Wildlife Habitat:**

Unit is in medium deer HSI value and high Marten HIS value. North facing slope below 800 feet in elevation.

#### **4. Visuals:**

Unit as designed meets VQO of Modification

### **B. TRANSPORTATION SYSTEM:**

Specified road 46251 runs to the last landing. It will continue past this unit in the future. To avoid wetlands as much as possible, an 800' segment of the road is located above the upper edge of a linear muskeg, but below the steeper ground located further upslope from the muskeg. This road will be put into "storage" after harvest is complete. All drainage structures will be removed to restore natural drainage patterns. Additional waterbars will be added as needed, and all areas of exposed soil will be grass seeded.

### **C. SILVICULTURAL PRESCRIPTION SUMMARY:**

(a) Clearcut for natural regeneration, use downhill cable yarding, manage as even-aged stand, certify regeneration, pre-commercial thin to increase diameter growth and to provide light for shrubs and forbs. (b) is same as (a) with uphill cable yarding system.

### **D. UNIT DESIGN:**

Partial suspension on steep slope on south end of unit.  
Upper unit boundary is located at slope break to protect soils.  
Unit boundary parallels wind direction providing windfirmness.  
Recommend running skyline to minimize soil disturbance (BMP 13.9)  
The northeast unit boundary was designed to avoid small beaver ponds.





# CRANE and ROWAN MOUNTAIN UNIT PLAN

**VCU-UNIT.ALT** 399-13.3

Management Prescription: Timber Production

Acres Even Aged: 50

Natural Stand Condition: Understory Reinitiation/Old Growth

Acres 2-Aged: 14

Desired Future Condition Even aged, 2-aged mixture

Acres Uneven Aged 0

Volume(MBF) 1946

USGS 1/4 QUAD MAP #: PTA D1 SW

Aerial Photo: 77

Flight# 6

Photo#

93

## **I. RESOURCE CONCERNS/OPPORTUNITIES - UNIT MANAGEMENT OBJECTIVES**

Class II stream east of unit - maintain riparian buffer. Two Class III streams in unit - maintain streambank stability.  
Class IV within unit.  
South winds predominate - incorporate disturbance ecology principles.  
Possible unstable soils on upper slopes - maintain slope stability.  
Wildlife Habitat - Maintain legacy structure in unit where possible for prey species habitat.  
Upper portion of unit visible from Saginaw Bay - Meet VQO of Modification

## **II. IMPLEMENTATION ACTIVITIES**

### **A. ECOSYSTEMS MANAGEMENT:**

#### **1. Vegetation:**

Southern part of unit is old growth. Central and south part of unit is understory reinitiation. Class III stream protected by buffer in northern part of unit is old landslide track originating from steep ground above unit and is understory reinitiation with high spruce component.

#### **2. Aquatic Habitat:**

Class I/II: No commercial harvest within 100 feet. No programmed commercial harvest within the Riparian Management Area. Manage an appropriate distance beyond the no harvest zone to provide windfirmness. (BMP 12.6 Riparian Area Designation and Protection.) The stream to the east is in the High Gradient Contained Process Group. Manage the area within 120 feet of the no-cut buffer to provide for windfirmness. Windthrow has been recorded in the area from SE winds.  
Class III: No programmed commercial timber harvest within the V-notch (side-slope break). Manage an appropriate distance beyond the slope break for windfirmness. (BMP 12.6 Riparian Area Designation and Protection; BMP 13.16 Stream Channel Protection) Southeast winds predominate requiring special attention on the south sides of the V-notches. Both streams within the unit are in the High Gradient Contained Process Group. Manage the area within 120 feet of the V-notch to provide for windfirmness. Windthrow has been recorded in the area from SE winds.  
Class IV: Field reconnaissance has identified the potential for one or two small Class IV streams in the unit. Provide adequate deflection to minimize soil disturbance by using tailtrees on ridge adjacent to the stream. Partially suspend logs over the stream. (BMP 13.16 Stream Channel Protection)

#### **3. Wildlife Habitat:**

Unit is in medium deer HSI value and high Marten HIS value. North facing slope below 800 feet in elevation. Retain multi-cohort stand structure and legacy to provide necessary habitat characteristics for forest dwelling species. Unit as designed meets the TLMP Standards and Guidelines for the upper portion of the unit and should surpass them for the lower portion of the unit.

#### **4. Visuals:**

Unit as designed meets VQO of Modification

### **B. TRANSPORTATION SYSTEM:**

Specified road 46251 runs to the last landing. It will continue past this unit in the future. To avoid wetlands as much as possible, an 800' segment of the road is located above the upper edge of a linear muskeg, but below the steeper ground located further upslope from the muskeg. This road will be put into "storage" after harvest is complete. All drainage structures will be removed to restore natural drainage patterns. Additional waterbars will be added as needed, and all areas of exposed soil will be grass seeded.

### **C. SILVICULTURAL PRESCRIPTION SUMMARY:**

(a) Clearcut for natural regeneration, use downhill cable yarding, manage as even-aged stand, certify regeneration, pre-commercial thin to increase diameter growth and to provide light for shrubs and forbs. (b) Seed Tree with Reserves using cable yarding, use upper and lower diameter limit Rx for hemlock and cedar. Reserve and paint 2 large spruce every 10 acres. Initial managed stand will have 3 cohorts; 1) Young trees from regeneration harvest. 2) Small residuals left from lower dia. limit harvest 3) Large residual trees with high wildlife value. Over time, it is expected that a 2-aged stand will develop as large trees are removed through senescence and wind snap or by windthrow.

### **D. UNIT DESIGN:**

Upper unit boundary is located at slope break to protect soils. Partial suspension on steep slope on south end of unit. Unit boundary parallels wind direction providing windfirmness.  
Recommend running skyline to minimize soil disturbance (BMP 13.9)  
The northeast unit boundary was designed to avoid small beaver ponds.





# CRANE and ROWAN MOUNTAIN UNIT PLAN

**VCU-UNIT.ALT 399-13.4**

Management Prescription: Timber Production

Acres Even Aged: 50

Natural Stand Condition: Understory Reinitiation/Old Growth

Acres 2-Aged: 14

Desired Future Condition Even aged, 2-aged mixture

Acres Uneven Aged 0

Volume(MBF) 1946

USGS 1/4 QUAD MAP #: PTA D1 SW

Aerial Photo: 77

Flight# 6

Photo#

93

## **I. RESOURCE CONCERNS/OPPORTUNITIES - UNIT MANAGEMENT OBJECTIVES**

Class II stream east of unit - maintain riparian buffer. Two Class III streams in unit - maintain streambank stability.  
Class IV within unit.  
South winds predominate - incorporate disturbance ecology principles.  
Possible unstable soils on upper slopes - maintain slope stability.  
Wildlife Habitat - Maintain legacy structure in unit where possible for prey species habitat.  
Upper portion of unit visible from Saginaw Bay - Meet VQO of Modification

## **II. IMPLEMENTATION ACTIVITIES**

### **A. ECOSYSTEMS MANAGEMENT:**

#### **1. Vegetation:**

Southern part of unit is old growth. Central and south part of unit is understory reinitiation. Class III stream protected by buffer in northern part of unit is old landslide track originating from steep ground above unit and is understory reinitiation with high spruce component.

#### **2. Aquatic Habitat:**

Class I/II: No commercial harvest within 100 feet. No programmed commercial harvest within the Riparian Management Area. Manage an appropriate distance beyond the no harvest zone to provide windfirmness. (BMP 12.6 Riparian Area Designation and Protection.) The stream to the east is in the High Gradient Contained Process Group. Manage the area within 120 feet of the no-cut buffer to provide for windfirmness. Windthrow has been recorded in the area from SE winds.  
Class III: No programmed commercial timber harvest within the V-notch (side-slope break). Manage an appropriate distance beyond the slope break for windfirmness. (BMP 12.6 Riparian Area Designation and Protection; BMP 13.16 Stream Channel Protection) Southeast winds predominate requiring special attention on the south sides of the V-notches. Both streams within the unit are in the High Gradient Contained Process Group. Manage the area within 120 feet of the V-notch to provide for windfirmness. Windthrow has been recorded in the area from SE winds.  
Class IV: Field reconnaissance has identified the potential for one or two small Class IV streams in the unit. Provide adequate deflection to minimize soil disturbance by using tailtrees on ridge adjacent to the stream. Partially suspend logs over the stream. (BMP 13.16 Stream Channel Protection)

#### **3. Wildlife Habitat:**

Unit is in medium deer HSI value and high Marten HIS value. North facing slope below 800 feet in elevation. Retain multi-cohort stand structure and legacy to provide necessary habitat characteristics for forest dwelling species. Unit as designed meets the TLMP Standards and Guidelines for the upper portion of the unit and should surpass them for the lower portion of the unit.

#### **4. Visuals:**

Unit as designed meets VQO of Modification

### **B. TRANSPORTATION SYSTEM:**

Specified road 46251 runs to the last landing. It will continue past this unit in the future. To avoid wetlands as much as possible, an 800' segment of the road is located above the upper edge of a linear muskeg, but below the steeper ground located further upslope from the muskeg. This road will be put into "storage" after harvest is complete. All drainage structures will be removed to restore natural drainage patterns. Additional waterbars will be added as needed, and all areas of exposed soil will be grass seeded.

### **C. SILVICULTURAL PRESCRIPTION SUMMARY:**

(a) Clearcut for natural regeneration, use downhill cable yarding, manage as even-aged stand, certify regeneration, pre-commercial thin to increase diameter growth and to provide light for shrubs and forbs. (b) Seed Tree with Reserves using cable yarding, use upper and lower diameter limit Rx for hemlock and cedar. Reserve and paint 2 large spruce every 10 acres. Initial managed stand will have 3 cohorts; 1) Young trees from regeneration harvest. 2) Small residuals left from lower dia. limit harvest 3) Large residual trees with high wildlife value. Over time, it is expected that a 2-aged stand will develop as large trees are removed through senescence and wind snap or by windthrow.

### **D. UNIT DESIGN:**

Upper unit boundary is located at slope break to protect soils. Partial suspension on steep slope on south end of unit. Unit boundary parallels wind direction providing windfirmness.  
Recommend running skyline to minimize soil disturbance (BMP 13.9)  
The northeast unit boundary was designed to avoid small beaver ponds.





# CRANE and ROWAN MOUNTAIN UNIT PLAN

**VCU-UNIT.ALT** 399-13.5

Management Prescription: Timber Production

Natural Stand Condition: Understory Reinitiation/Old Growth

Desired Future Condition Even aged

Acres Even Aged: 64

Acres 2-Aged: 0

Acres Uneven Aged 0

Volume(MBF) 2150.4

USGS 1/4 QUAD MAP #: PTA D1 SW

Aerial Photo: 77

Flight# 6

Photo# 93

## I. RESOURCE CONCERNS/OPPORTUNITIES - UNIT MANAGEMENT OBJECTIVES

- Class II stream east of unit - maintain riparian buffer.
- Two Class III streams in unit - maintain streambank stability.
- Class IV within unit.
- South winds predominate - incorporate disturbance ecology principles.
- Possible unstable soils on upper slopes - maintain slope stability.
- Upper portion of unit visible from Saginaw Bay - Meet VQO of Modification

## II. IMPLEMENTATION ACTIVITIES

### A. ECOSYSTEMS MANAGEMENT:

#### 1. Vegetation:

Southern part of unit is old growth. Central and south part of unit is understory reinitiation. Class III stream protected by buffer in northern part of unit is old landslide track originating from steep ground above unit and is understory reinitiation with high spruce component.

#### 2. Aquatic Habitat:

Class I/II: No commercial harvest within 100 feet. No programmed commercial harvest within the Riparian Management Area. Manage an appropriate distance beyond the the no harvest zone to provide windfirmness. (BMP 12.6 Riparian Area Designation and Protection.) The stream to the east is in the High Gradient Contained Process Group. Manage the area within 120 feet of the no-cut buffer to provide for windfirmness. Windthrow has been recorded in the area from SE winds.

Class III: No programmed commercial timber harvest within the V-notch (side-slope break). Manage an appropriate distance beyond the slope break for windfirmness. (BMP 12.6 Riparian Area Designation and Protection; BMP 13.16 Stream Channel Protection) Southeast winds predominate requiring special attention on the south sides of the V-notches. Both streams within the unit are in the High Gradient Contained Process Group. Manage the area within 120 feet of the V-notch to provide for windfirmness. Windthrow has been recorded in the area from SE winds.

Class IV: Field reconnaissance has identified the potential for one or two small Class IV streams in the unit. Provide adequate deflection to minimize soil disturbance by using tailtrees on ridge adjacent to the stream. Partially suspend logs over the stream.( BMP13.16 Stream Channel Protection)

#### 3. Wildlife Habitat:

Unit is in medium deer HSI value and high Marten HIS value. North facing slope below 800 feet in elevation.

#### 4. Visuals:

Unit as deaigned meets VQO of Modification

### B. TRANSPORTATION SYSTEM:

Specified road 46251 runs to the last landing. It will continue past this unit in the future. To avoid wetlands as much as possible, an 800' segment of the road is located above the upper edge of a linear muskeg, but below the steeper ground located further upslope from the muskeg. This road will be put into "storage" after harvest is complete. All drainage structures will be removed to restore natural drainage patterns. Additional waterbars will be added as needed, and all areas of exposed soil will be grass seeded.

### C. SILVICULTURAL PRESCRIPTION SUMMARY:

(a) Clearcut for natural regeneration, use downhill cable yarding, manage as even-aged stand, certify regeneration, pre-commercial thin to increase diameter growth and to provide light for shrubs and forbs. (b) is same as (a) with uphill cable yarding system.

### D. UNIT DESIGN:

Upper unit boundary is located at slope break to protect soils.

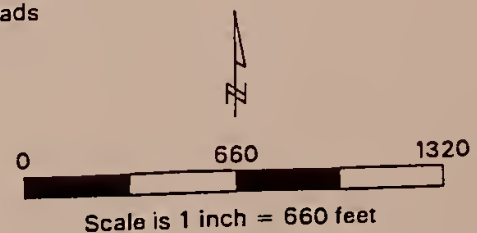
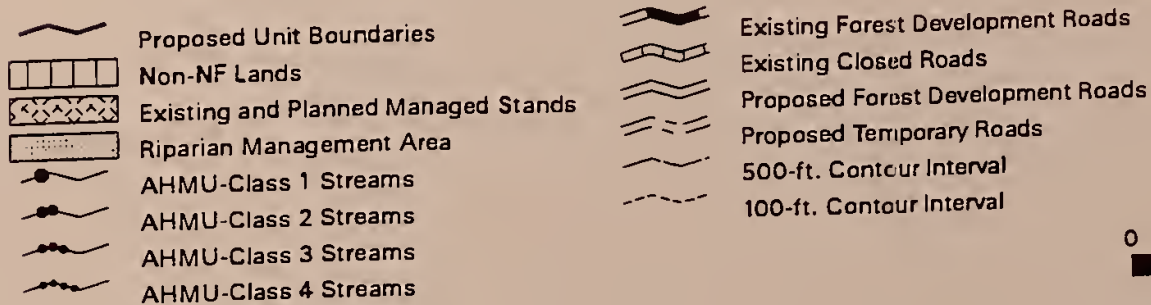
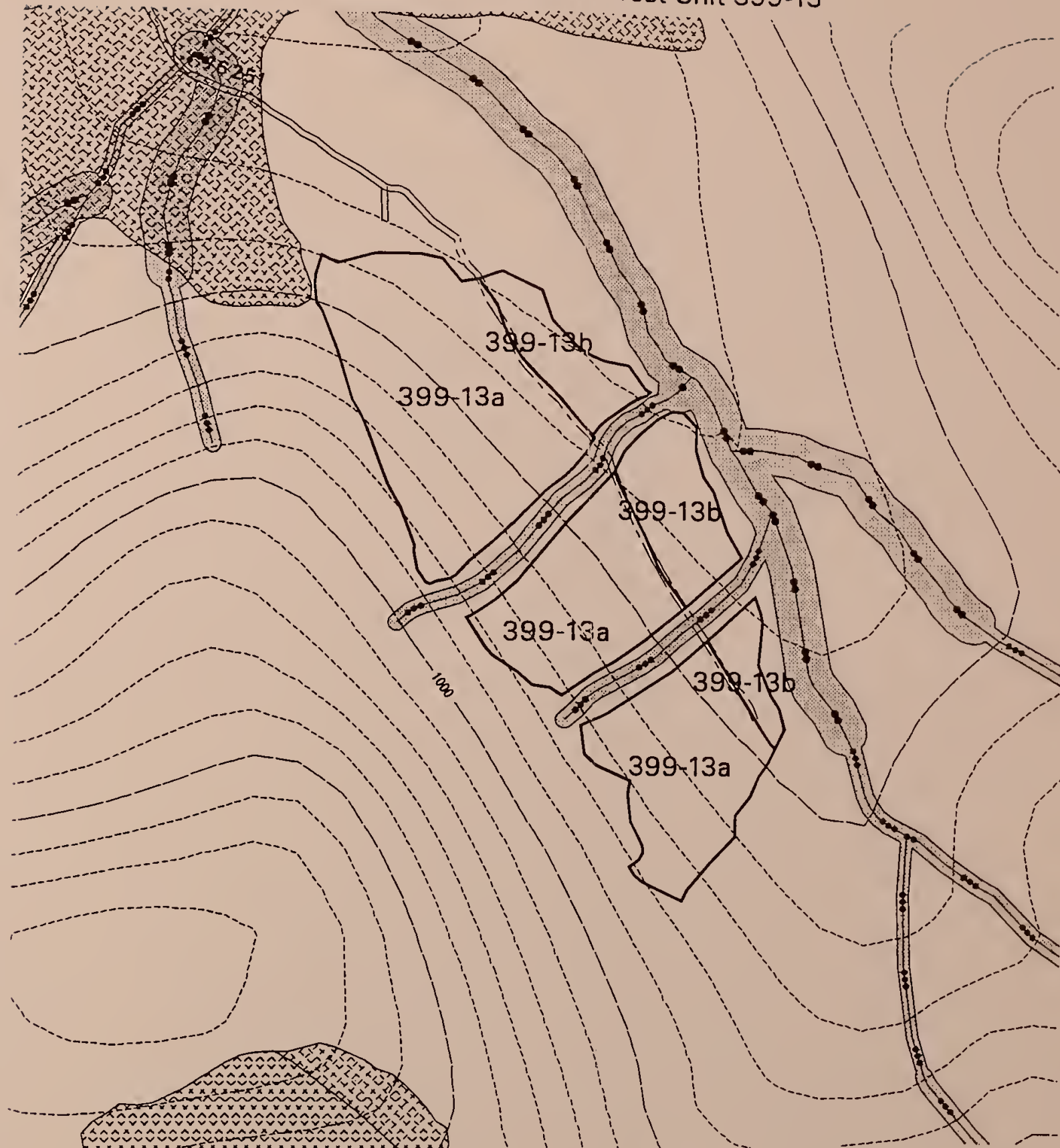
Partial suspension on steep slope on south end of unit.

Unit boundary parallels wind direction providing windfirmness.

Recommend running skyline to minimize soil disturbance (BMP 13.9)

The northeast unit boundary was designed to avoid small beaver ponds.

## Crane/Rowan Timber Harvest Unit 399-13







## CRANE and ROWAN MOUNTAIN UNIT PLAN

**VCU-UNIT.ALT** 400-8.2

Management Prescription: Timber Production

Acres Even Aged: 29

Natural Stand Condition: Old Growth

Acres 2-Aged: 0

Desired Future Condition Even-aged

Acres Uneven Aged 0

Volume(MBF) 974.4

USGS 1/4 QUAD MAP #: PAX D1 SW

Aerial Photo: 77

Flight# 5

Photo#

73

### I. RESOURCE CONCERNS/OPPORTUNITIES - UNIT MANAGEMENT OBJECTIVES

Watershed exceeds 20% harvest in 30 years - conduct watershed analysis

Wildlife - Maintain corridor.

Unit is visible from saltwater - meet modification VQO.

Winds from the south predominate - incorporate disturbance ecology principles.

Class III stream along southeast portion of unit and through middle of unit - protect stream channel stability.

Possible unstable soils on upper slope in area adjacent to the SE boundary - maintain soil stability.

### II. IMPLEMENTATION ACTIVITIES

#### A. ECOSYSTEMS MANAGEMENT:

##### 1. Vegetation:

Old Growth stand, stems widely spaced, with more Mtn. Hemlock than average.

##### 2. Aquatic Habitat:

Class III: No programmed commercial timber harvest within the V-notch (side-slope break). Manage an appropriate distance beyond the slope break for windfirmness. (BMP 12.6 Riparian Area Designation and Protection; BMP 13.16 Stream Channel Protection) The Class III stream is in the High Gradient Contained Process Group. Manage the area within 120 feet of the V-notch for windfirmness, paying special attention to the south side of the stream since south winds predominate.

##### 3. Wildlife Habitat:

Unit is in high/medium deer HSI value and high/medium Marten HIS value. West facing slope below 800 feet in elevation. Unit will be clearcut and will meet TLMP S&Gs for wildlife.

##### 4. Visuals:

The landscape is viewed in the middleground distance and is part of the Security Bay viewshed. Past timber harvest dominates the east Security viewshed; where landscapes are gently rolling, with valleys and ridges interspersed through the area. Landscape in west Security and the inner lagoon area rise sharply, with steep slopes creating a dramatic landscape setting.

#### B. TRANSPORTATION SYSTEM:

A temporary spur will run through the upper portion of the unit and continue on into 400-9. An ~40 ft. log stringer bridge is planned for crossing the class III stream in the unit. After harvest, the bridge and all other drainage structures will be removed to restore natural drainage patterns. Additional waterbars will be installed as needed. All areas of exposed soil will be grass seeded.

#### C. SILVICULTURAL PRESCRIPTION SUMMARY:

Even-age Clearcut using cable yarding system, certify natural regeneration, pre-commercial thin to maintain healthy stand.

#### D. UNIT DESIGN:

Unit is designed in conjunction with 400-21 to provide wildlife travel corridor from Security Creek to the ridge above the units.

Unit shape and location is essential to meeting visual objectives.

Steep ground to east of unit is avoided by locating boundary on class III stream.

Recommend shovel yarding in two northwest settings; running skyline in other setting.

Unit is oriented parallel to prevailing storm winds to minimize windthrow.

North boundary located along scrub timber that should be windfirm.





## CRANE and ROWAN MOUNTAIN UNIT PLAN

**VCU-UNIT.ALT** 400-8.3

Management Prescription: Timber Production

Acres Even Aged: 0

Natural Stand Condition: Old Growth

Acres 2-Aged: 0

Desired Future Condition Uneven-aged

Acres Uneven Aged 29

Volume(MBF) 290

USGS 1/4 QUAD MAP #: PAX D1 SW

Aerial Photo: 77

Flight# 5

Photo#

73

### **I. RESOURCE CONCERNS/OPPORTUNITIES - UNIT MANAGEMENT OBJECTIVES**

Watershed exceeds 20% harvest in 30 years - conduct watershed analysis

Wildlife - Maintain corridor.

Unit is visible from saltwater - meet modification VQO.

Winds from the south predominate - incorporate disturbance ecology principles.

Class III stream along south portion of unit - protect stream channel stability.

Possible unstable soils on upper slope in area adjacent to the SE boundary - maintain soil stability.

### **II. IMPLEMENTATION ACTIVITIES**

#### **A. ECOSYSTEMS MANAGEMENT:**

##### **1. Vegetation:**

Old Growth stand, stems widely spaced, with more Mtn. Hemlock than average.

##### **2. Aquatic Habitat:**

Class III: No programmed commercial timber harvest within the V-notch (side-slope break). Manage an appropriate distance beyond the slope break for windfirmness. (BMP 12.6 Riparian Area Designation and Protection; BMP 13.16 Stream Channel Protection) The Class III stream is in the High Gradient Contained Process Group. Manage the area within 120 feet of the V-notch for windfirmness, paying special attention to the south side of the stream since south winds predominate.

##### **3. Wildlife Habitat:**

Unit is in high/medium deer HSI value and high/medium Marten HIS value. West facing slope below 800 feet in elevation. Unit will be clearcut and will meet TLMP S&Gs for wildlife.

##### **4. Visuals:**

The landscape is viewed in the middleground distance and is part of the Security Bay viewshed. Past timber harvest dominates the east Security viewshed; where landscapes are gently rolling, with valleys and ridges interspersed through the area. Landscape in west Security and the inner lagoon area rise sharply, with steep slopes creating a dramatic landscape setting.

#### **B. TRANSPORTATION SYSTEM:**

A temporary spur will run through the upper portion of the unit and continue on into 400-9. An ~40 ft. log stringer bridge is planned for crossing the class III stream in the unit. After harvest, the bridge and all other drainage structures will be removed to restore natural drainage patterns. Additional waterbars will be installed as needed. All areas of exposed soil will be grass seeded.

#### **C. SILVICULTURAL PRESCRIPTION SUMMARY:**

Seed Tree with Reserves using helicopter yarding, use upper and lower diameter limit Rx for hemlock and cedar. Reserve and plant 2 large spruce every 10 acres. Initial managed stand will have 3 cohorts; 1) Young trees from regeneration harvest. 2) Small residuals left from lower dia. limit harvest 3) Large residual trees with high wildlife value. Over time it is expected that the unit will remain uneven-aged as it is sheltered from the wind.

#### **D. UNIT DESIGN:**

Unit is designed in conjunction with 400-21 to provide wildlife travel corridor from Security Creek to the ridge above the units. Unit shape and location is essential to meeting visual objectives. Steep ground to east of unit is avoided by locating boundary on class III stream. Recommend shovel yarding in two northwest settings; running skyline in other setting. Unit is oriented parallel to prevailing storm winds to minimize windthrow. North boundary located along scrub timber that should be windfirm.



## CRANE and ROWAN MOUNTAIN UNIT PLAN

**VCU-UNIT.ALT** 400-8.4

Management Prescription: Timber Production

Natural Stand Condition: Old Growth

Desired Future Condition

Acres Even Aged: 0

Acres 2-Aged: 0

Acres Uneven Aged 0

Volume(MBF) 0

USGS 1/4 QUAD MAP #: PAX D1 SW

Aerial Photo: 77

Flight# 5

Photo#

73

### I. RESOURCE CONCERNS/OPPORTUNITIES - UNIT MANAGEMENT OBJECTIVES

Watershed exceeds 20% harvest in 30 years - conduct watershed analysis

Unit not in Alternative 4

### II. IMPLEMENTATION ACTIVITIES

#### A. ECOSYSTEMS MANAGEMENT:

1. Vegetation:

2. Aquatic Habitat:

3. Wildlife Habitat:

4. Visuals:

#### B. TRANSPORTATION SYSTEM:

#### C. SILVICULTURAL PRESCRIPTION SUMMARY:

#### D. UNIT DESIGN:











## CRANE and ROWAN MOUNTAIN UNIT PLAN

**VCU-UNIT.ALT** 400-9.2

Management Prescription: Timber Production

Acres Even Aged: 33

Natural Stand Condition: Old Growth

Acres 2-Aged: 0

Desired Future Condition Even-aged

Acres Uneven Aged 0

Volume(MBF) 1108.8

USGS 1/4 QUAD MAP #: PTA D1 SW

Aerial Photo: 77

Flight# 5

Photo#

72

### I. RESOURCE CONCERNS/OPPORTUNITIES - UNIT MANAGEMENT OBJECTIVES

Watershed exceeds 20% harvest in 30 years - conduct watershed analysis

Class III stream east of unit - maintain stream channel.

Winds from the South predominate - incorporate disturbance ecology principles.

Unit is visible from saltwater - meet modification VQO.

### II. IMPLEMENTATION ACTIVITIES

#### A. ECOSYSTEMS MANAGEMENT:

##### 1. Vegetation:

Stand is Old Growth with no apparent cohorts, average site.

##### 2. Aquatic Habitat:

Class III: No programmed commercial timber harvest within the V-notch (side-slope break). Manage an appropriate distance beyond the slope break for windfirmness. (BMP 12.6 Riparian Area Designation and Protection; BMP 13.16 Stream Channel Protection) The stream along the eastern boundary is in the High Gradient Contained Process Group. Manage the area 120 feet beyond the V-notch for windfirmness. The buffer may be susceptible to SW winds.

##### 3. Wildlife Habitat:

Unit is in high/medium deer HSI value and high Marten HIS value. West facing slope below 800 feet in elevation.

##### 4. Visuals:

The landscape is viewed in the middleground distance and is part of the Security Bay viewshed. Past timber harvest dominates the east Security viewshed; where landscapes are gently rolling, with valleys and ridges interspersed through the area. Landscape in west Security and the inner lagoon area rise sharply, with steep slopes creating a dramatic landscape setting.

#### B. TRANSPORTATION SYSTEM:

The temporary spur continuing on from 400-8 ends at the landing for the cable setting at the north end of 400-9. The southern setting will be yarded by helicopter to avoid ~500 ft. of full bench road that would be needed to access a cable landing. All drainage structures will be removed from the temporary spur to restore natural drainage patterns. Additional waterbars will be added as needed, and all areas of exposed soil will be grass seeded.

#### C. SILVICULTURAL PRESCRIPTION SUMMARY:

Evenage Clearcut using cable yarding system, certify natural regeneration, pre-commercial thin to maintain healthy stand.

#### D. UNIT DESIGN:

Use class III stream east of unit as boundary.

Northern boundary is along windfirm scrub muskeg and an existing harvest unit.



## CRANE and ROWAN MOUNTAIN UNIT PLAN

**VCU-UNIT.ALT 400-9.3**

Management Prescription: Timber Production

Acres Even Aged: 0

Natural Stand Condition: Old Growth

Acres 2-Aged: 33

Desired Future Condition 2-aged

Acres Uneven Aged 0

Volume(MBF) 627

USGS 1/4 QUAD MAP #: PTA D1 SW

Aerial Photo: 77

Flight# 5

Photo#

72

### I. RESOURCE CONCERNS/OPPORTUNITIES - UNIT MANAGEMENT OBJECTIVES

Watershed exceeds 20% harvest in 30 years - conduct watershed analysis

Class III stream east of unit - maintain stream channel.

Winds from the South predominate - incorporate disturbance ecology principles.

Wildlife Habitat - Maintain legacy structure in unit where possible for prey species habitat through alternative silvicultural prescription.

Unit is visible from saltwater - meet modification VQO.

### II. IMPLEMENTATION ACTIVITIES

#### A. ECOSYSTEMS MANAGEMENT:

##### 1. Vegetation:

Stand is Old Growth with no apparent cohorts, average site.

##### 2. Aquatic Habitat:

Class III: No programmed commercial timber harvest within the V-notch (side-slope break). Manage an appropriate distance beyond the slope break for windfirmness. (BMP 12.6 Riparian Area Designation and Protection; BMP 13.16 Stream Channel Protection) The stream along the eastern boundary is in the High Gradient Contained Process Group. Manage the area 120 feet beyond the V-notch for windfirmness. The buffer may be susceptible to SW winds.

##### 3. Wildlife Habitat:

Unit is in high/medium deer HSI value and high Marten HIS value.

Retain multi-cohort stand structure and legacy to provide necessary habitat characteristics for forest dwelling species. Unit will be harvested using alternative silvicultural prescriptions. This should exceed TLMP S&Gs.

##### 4. Visuals:

The landscape is viewed in the middleground distance and is part of the Security Bay viewshed. Past timber harvest dominates the east Security viewshed; where landscapes are gently rolling, with valleys and ridges interspersed through the area. Landscape in west Security and the inner lagoon area rise sharply, with steep slopes creating a dramatic landscape setting. Unit as designed with 2-aged prescription achieves partial retention VQO.

#### B. TRANSPORTATION SYSTEM:

The temporary spur continuing on from 400-8 ends at the landing for the cable setting at the north end of 400-9. The southern setting will be yarded by helicopter to avoid ~500 ft. of full bench road that would be needed to access a cable landing. All drainage structures will be removed from the temporary spur to restore natural drainage patterns. Additional waterbars will be added as needed, and all areas of exposed soil will be grass seeded.

#### C. SILVICULTURAL PRESCRIPTION SUMMARY:

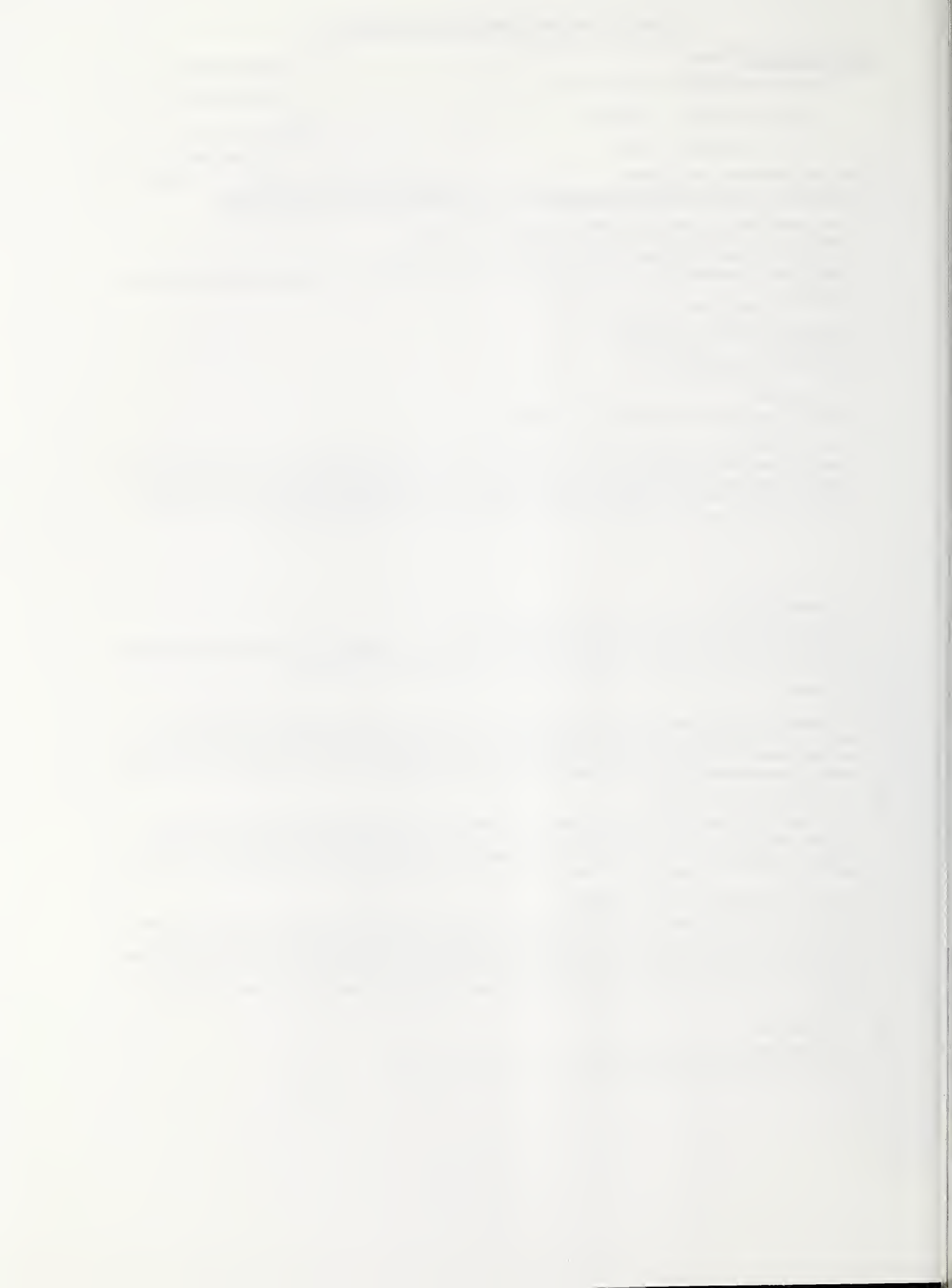
2-Aged Seedtree with reserves (upper and lower diameter limit Rx for hemlock and cedar, paint for reserve 2 large spruce every 10 acres) using cable and helicopter yarding systems, certify natural regeneration, pre-commercial thin to maintain healthy stand. Initial managed stand will have 3 cohorts; 1) Young component from regeneration harvest. 2) Small residuals left from lower dia. limit harvest 3) Large residual trees with high wildlife value. With moderate to high wind disturbance potential, it is expected that over time the unit will become 2-aged through senescence of larger diameter trees by wind snap.

#### D. UNIT DESIGN:

Use class III stream east of unit as boundary.

Northern boundary is along windfirm scrub muskeg and an existing harvest unit.





## CRANE and ROWAN MOUNTAIN UNIT PLAN

**VCU-UNIT.ALT 400-9.4**

Management Prescription: Timber Production

Acres Even Aged: 0

Natural Stand Condition: Old Growth

Acres 2-Aged: 33

Desired Future Condition 2-aged

Acres Uneven Aged 0

Volume(MBF) 627

USGS 1/4 QUAD MAP #: PTA D1 SW

Aerial Photo: 77 Flight# 5 Photo# 72

### I. RESOURCE CONCERNS/OPPORTUNITIES - UNIT MANAGEMENT OBJECTIVES

See unit card 400-22.4 for combined unit card.

Wildlife Habitat - Maintain legacy structure in unit where possible for prey species habitat through alternative silvicultural prescription.

Unit is visible from saltwater - meet modification VQO.

### II. IMPLEMENTATION ACTIVITIES

#### A. ECOSYSTEMS MANAGEMENT:

##### 1. Vegetation:

Stand is Old Growth with no apparent cohorts, average site.

##### 2. Aquatic Habitat:

Class III: No programmed commercial timber harvest within the V-notch (side-slope break). Manage an appropriate distance beyond the slope break for windfirmness. (BMP 12.6 Riparian Area Designation and Protection; BMP 13.16 Stream Channel Protection) The stream along the eastern boundary is in the High Gradient Contained Process Group. Manage the area 120 feet beyond the V-notch for windfirmness. The buffer may be susceptible to SW winds.

##### 3. Wildlife Habitat:

Unit is in high/medium deer HSI value and high Marten HIS value.

Retain multi-cohort stand structure and legacy to provide necessary habitat characteristics for forest dwelling species. Unit will be harvested using alternative silvicultural prescriptions. This should exceed TLMP S&Gs.

##### 4. Visuals:

The landscape is viewed in the middleground distance and is part of the Security Bay viewshed. Past timber harvest dominates the east Security viewshed; where landscapes are gently rolling, with valleys and ridges interspersed through the area. Landscape in west Security and the inner lagoon area rise sharply, with steep slopes creating a dramatic landscape setting.

Unit as designed with 2-aged prescription achieves partial retention VQO.

#### B. TRANSPORTATION SYSTEM:

With unit 400-8 not included in this alternative, it is more economical to helicopter yard 400-9 than build 0.9 miles of temporary spur to access one 5-acre cable setting. Use helicopter landing on existing road 6402. No new roads needed.

#### C. SILVICULTURAL PRESCRIPTION SUMMARY:

Seed Tree with Reserves using helicopter yarding, use upper and lower diameter limit Rx for hemlock and cedar. Reserve and plant 2 large spruce every 10 acres. Initial managed stand will have 3 cohorts; 1) Young trees from regeneration harvest. 2) Small residuals left from lower dia. limit harvest 3) Large residual trees with high wildlife value. Over time, it is expected that a 2-aged stand will develop as large trees are removed through senescence and wind snap or by windthrow

#### D. UNIT DESIGN:

Use class III stream east of unit as boundary.

Northern boundary is along windfirm scrub muskeg and an existing harvest unit.





CRANE and ROWAN MOUNTAIN UNIT PLAN

**VCU-UNIT.ALT 400-9.5**  
Management Prescription: Timber Production  
Natural Stand Condition: Old Growth  
Desired Future Condition

Acres Even Aged: 0  
Acres 2-Aged: 0  
Acres Uneven Aged: 0  
Volume(MBF) 0

USGS 1/4 QUAD MAP #: PTA D1 SW

Aerial Photo: 77 Flight# 5 Photo# 72

**I. RESOURCE CONCERNS/OPPORTUNITIES - UNIT MANAGEMENT OBJECTIVES**

Unit not in Alternative 5

**II. IMPLEMENTATION ACTIVITIES**

**A. ECOSYSTEMS MANAGEMENT:**

- 1. Vegetation:
- 2. Aquatic Habitat:

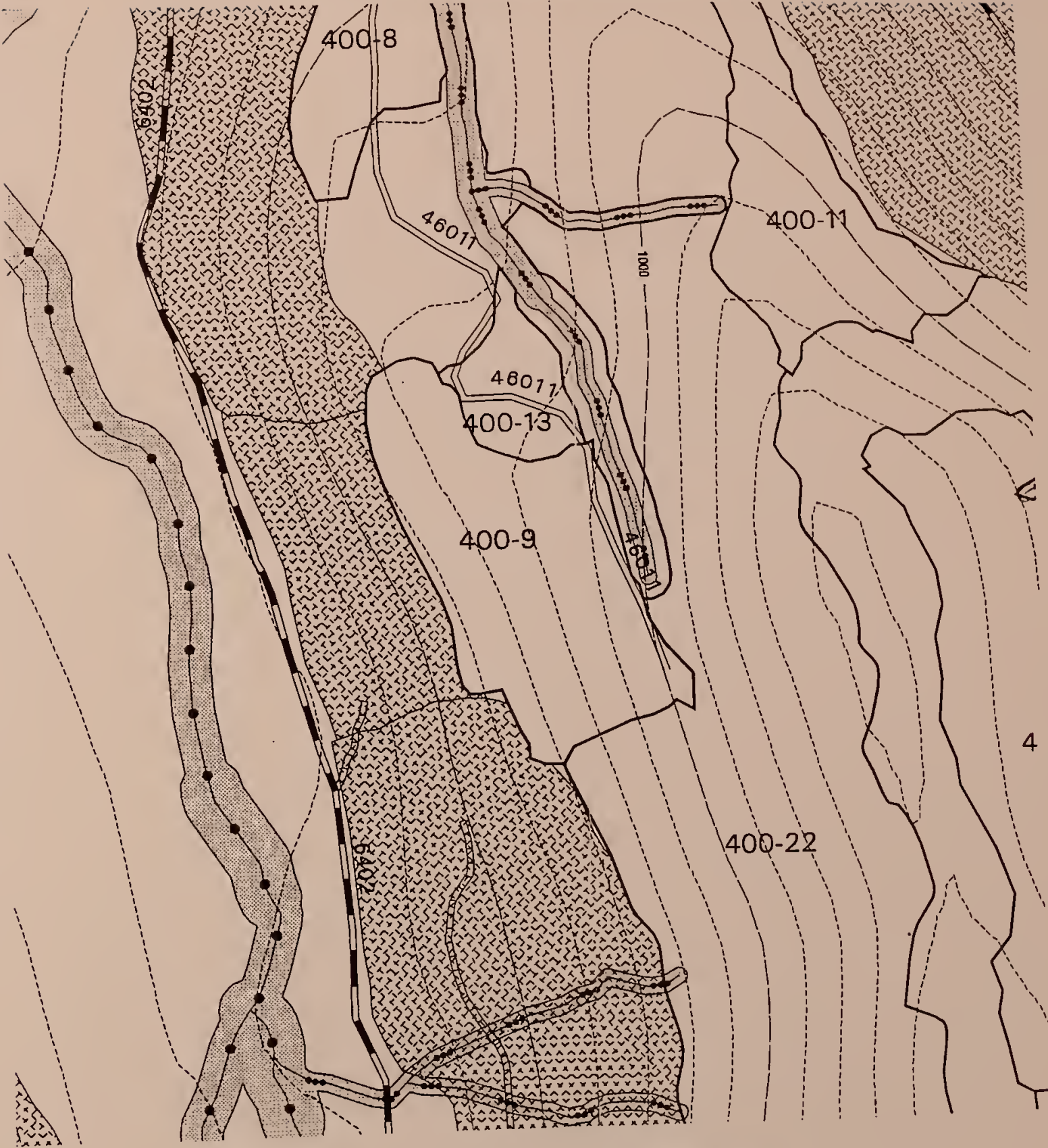
- 3. Wildlife Habitat:
- 4. Visuals:

**B. TRANSPORTATION SYSTEM:**

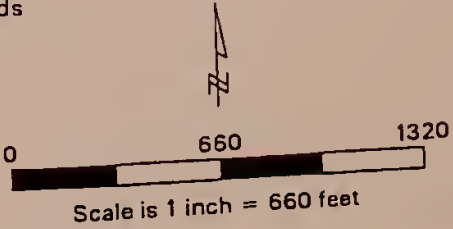
**C. SILVICULTURAL PRESCRIPTION SUMMARY:**

**D. UNIT DESIGN:**

Crane/Rowan Timber Harvest Unit 400-9



- Proposed Unit Boundaries
- Non-NF Lands
- Existing and Planned Managed Stands
- Riparian Management Area
- AHMU-Class 1 Streams
- AHMU-Class 2 Streams
- AHMU-Class 3 Streams
- AHMU-Class 4 Streams
- Existing Forest Development Roads
- Existing Closed Roads
- Proposed Forest Development Roads
- Proposed Temporary Roads
- 500-ft. Contour Interval
- 100-ft. Contour Interval





## CRANE and ROWAN MOUNTAIN UNIT PLAN

**VCU-UNIT.ALT** 400-11.2

Management Prescription: Timber Production

Natural Stand Condition: Old growth

Desired Future Condition Even aged

Acres Even Aged: 26

Acres 2-Aged: 0

Acres Uneven Aged 0

Volume(MBF) 873.6

USGS 1/4 QUAD MAP #: PTA D1 SW

Aerial Photo: 77

Flight# 5

Photo#

72

### I. RESOURCE CONCERNS/OPPORTUNITIES - UNIT MANAGEMENT OBJECTIVES

Watershed exceeds 20% harvest in 30 years - conduct watershed analysis

Unit is visible from saltwater - meet modification VQO.

Access "difficult" component of the ASQ - develop techniques for managing this component.

Unit is in high probability wind zone - incorporate disturbance ecology principles.

No streams in unit.

### II. IMPLEMENTATION ACTIVITIES

#### A. ECOSYSTEMS MANAGEMENT:

##### 1. Vegetation:

oldgrowth

##### 2. Aquatic Habitat:

No Class I/II streams in Unit.

No Class III streams in Unit.

##### 3. Wildlife Habitat:

Unit is in medium deer HSI value and high Marten HIS value. North facing slope below 1200 feet in elevation.

##### 4. Visuals:

The landscape is viewed in the middleground distance and is part of the Security Bay viewshed. Past timberharvest dominates the east Security viewshed; where landscapes are gently rolling. The inner lagoon area and west Security are pristine in character, where the landscapes rise sharply, with steep slopes creating a dramatic landscape setting.

#### B. TRANSPORTATION SYSTEM:

Unit is not accessible by road due to steep topography. Planned helicopter unit will use landing on existing road 6401. No new roads needed.

#### C. SILVICULTURAL PRESCRIPTION SUMMARY:

Clearcut for natural regeneration, use helicopter yarding, manage as even-aged stand, certify regeneration, pre-commercial thin to increase diameter growth and to provide light for shrubs and forbs.

#### D. UNIT DESIGN:

Unit is planned for helicopter yarding, as it is isolated above the backline of an old harvest unit and is not accessible by road due to steep topography.

Unit boundaries are parallel to southeast winds and due to oblique viewing angle will meet the visual objective.





## CRANE and ROWAN MOUNTAIN UNIT PLAN

**VCU-UNIT.ALT** 400-11.2

Management Prescription: Timber Production

Acres Even Aged: 26

Natural Stand Condition: Old growth

Acres 2-Aged: 0

Desired Future Condition Even aged

Acres Uneven Aged 0

Volume(MBF) 873.6

USGS 1/4 QUAD MAP #: PTA D1 SW

Aerial Photo: 77

Flight# 5

Photo#

72

### I. RESOURCE CONCERNS/OPPORTUNITIES - UNIT MANAGEMENT OBJECTIVES

Watershed exceeds 20% harvest in 30 years - conduct watershed analysis

Unit is visible from saltwater - meet modification VQO.

Access "difficult" component of the ASQ - develop techniques for managing this component.

Unit is in high probability wind zone - incorporate disturbance ecology principles.

No streams in unit.

### II. IMPLEMENTATION ACTIVITIES

#### A. ECOSYSTEMS MANAGEMENT:

##### 1. Vegetation:

oldgrowth

##### 2. Aquatic Habitat:

No Class I/II streams in Unit.

No Class III streams in Unit.

##### 3. Wildlife Habitat:

Unit is in medium deer HSI value and high Marten HIS value. North facing slope below 1200 feet in elevation.

##### 4. Visuals:

The landscape is viewed in the middleground distance and is part of the Security Bay viewshed. Past timberharvest dominates the east Security viewshed; where landscapes are gently rolling. The inner lagoon area and west Security are pristine in character, where the landscapes rise sharply, with steep slopes creating a dramatic landscape setting.

#### B. TRANSPORTATION SYSTEM:

Unit is not accessible by road due to steep topography. Planned helicopter unit will use landing on existing road 6401. No new roads needed.

#### C. SILVICULTURAL PRESCRIPTION SUMMARY:

Clearcut for natural regeneration, use helicopter yarding, manage as even-aged stand, certify regeneration, pre-commercial thin to increase diameter growth and to provide light for shrubs and forbs.

#### D. UNIT DESIGN:

Unit is planned for helicopter yarding, as it is isolated above the backline of an old harvest unit and is not accessible by road due to steep topography.

Unit boundaries are parallel to southeast winds and due to oblique viewing angle will meet the visual objective.





## CRANE and ROWAN MOUNTAIN UNIT PLAN

**VCU-UNIT.ALT** 400-11.3

Management Prescription: Timber Production

Acres Even Aged: 0

Natural Stand Condition: Old Growth

Acres 2-Aged: 0

Desired Future Condition Uneven aged

Acres Uneven Aged 26

Volume(MBF) 260

USGS 1/4 QUAD MAP #: PTA D1 SW

Aerial Photo: 77

Flight# 5

Photo#

72

### I. RESOURCE CONCERNS/OPPORTUNITIES - UNIT MANAGEMENT OBJECTIVES

Watershed exceeds 20% harvest in 30 years - conduct watershed analysis

Unit is visible from saltwater - meet modification VQO.

Access "difficult" component of the ASQ - develop techniques for managing this component.

Unit is in Low probability wind zone - incorporate disturbance ecology principles

Wildlife Habitat - Maintain legacy structure in unit where possible for prey species habitat through alternative silvicultural prescription.

No streams in unit.

### II. IMPLEMENTATION ACTIVITIES

#### A. ECOSYSTEMS MANAGEMENT:

##### 1. Vegetation:

oldgrowth

##### 2. Aquatic Habitat:

No Class I/II streams in Unit.

No Class III streams in Unit.

##### 3. Wildlife Habitat:

Unit is in medium deer HSI value and high Marten HIS value. North facing slope below 1200 feet in elevation.

Retain multi-cohort stand structure and legacy to provide necessary habitat characteristics for forest dwelling species. Unit will be harvested using alternative silvicultural prescriptions. This should exceed TLMP S&Gs.

##### 4. Visuals:

The landscape is viewed in the middleground distance and is part of the Security Bay viewshed. Past timber harvest dominates the east Security viewshed; where landscapes are gently rolling. The inner lagoon area and west Security are pristine in character, where the landscapes rise sharply, with steep slopes creating a dramatic landscape setting.

#### B. TRANSPORTATION SYSTEM:

Unit is not accessible by road due to steep topography. Planned helicopter unit will use landing on existing road 6401. No new roads needed.

#### C. SILVICULTURAL PRESCRIPTION SUMMARY:

Seed Tree with Reserves using helicopter yarding, use upper and lower diameter limit Rx for hemlock and cedar. Reserve and plant 2 large spruce every 10 acres. Initial managed stand will have 3 cohorts; 1) Young trees from regeneration harvest. 2) Small residuals left from lower dia. limit harvest 3) Large residual trees with high wildlife value. Over time, it is expected that a 2-aged stand will develop as large trees are removed through senescence and wind snap or by windthrow

#### D. UNIT DESIGN:

Unit is planned for helicopter yarding, as it is isolated above the backline of an old harvest unit and is not accessible by road due to steep topography.

Unit boundaries are parallel to southeast winds and due to oblique viewing angle will meet the visual objective.



## CRANE and ROWAN MOUNTAIN UNIT PLAN

**VCU-UNIT.ALT** 400-11.4

Management Prescription: Timber Production

Natural Stand Condition: Old growth

Desired Future Condition 2-aged

Acres Even Aged: 0

Acres 2-Aged: 26

Acres Uneven Aged 0

Volume(MBF) 494

USGS 1/4 QUAD MAP #: PTA D1 SW

Aerial Photo: 77

Flight# 5

Photo#

72

### I. RESOURCE CONCERNS/OPPORTUNITIES - UNIT MANAGEMENT OBJECTIVES

See unit card 400-22.4 for combination unit.

Wildlife Habitat - Maintain legacy structure in unit where possible for prey species habitat through alternative silvicultural prescription.

No streams in unit.

### II. IMPLEMENTATION ACTIVITIES

#### A. ECOSYSTEMS MANAGEMENT:

##### 1. Vegetation:

oldgrowth

##### 2. Aquatic Habitat:

No Class I/II streams in Unit.

No Class III streams in Unit.

##### 3. Wildlife Habitat:

Unit is in medium deer HSI value and high Marten HIS value. North facing slope below 1200 feet in elevation.

Retain multi-cohort stand structure and legacy to provide necessary habitat characteristics for forest dwelling species. Unit will be harvested using alternative silvicultural prescriptions. This should exceed TLMP S&Gs.

##### 4. Visuals:

The landscape is viewed in the middleground distance and is part of the Security Bay viewshed. Past timberharvest dominates the east Security viewshed; where landscapes are gently rolling. The inner lagoon area and west Security are pristine in character, where the landscapes rise sharply, with steep slopes creating a dramatic landscape setting.

#### B. TRANSPORTATION SYSTEM:

Unit is not accessible by road due to steep topography. Planned helicopter unit will use landing on existing road 6401. No new roads needed.

#### C. SILVICULTURAL PRESCRIPTION SUMMARY:

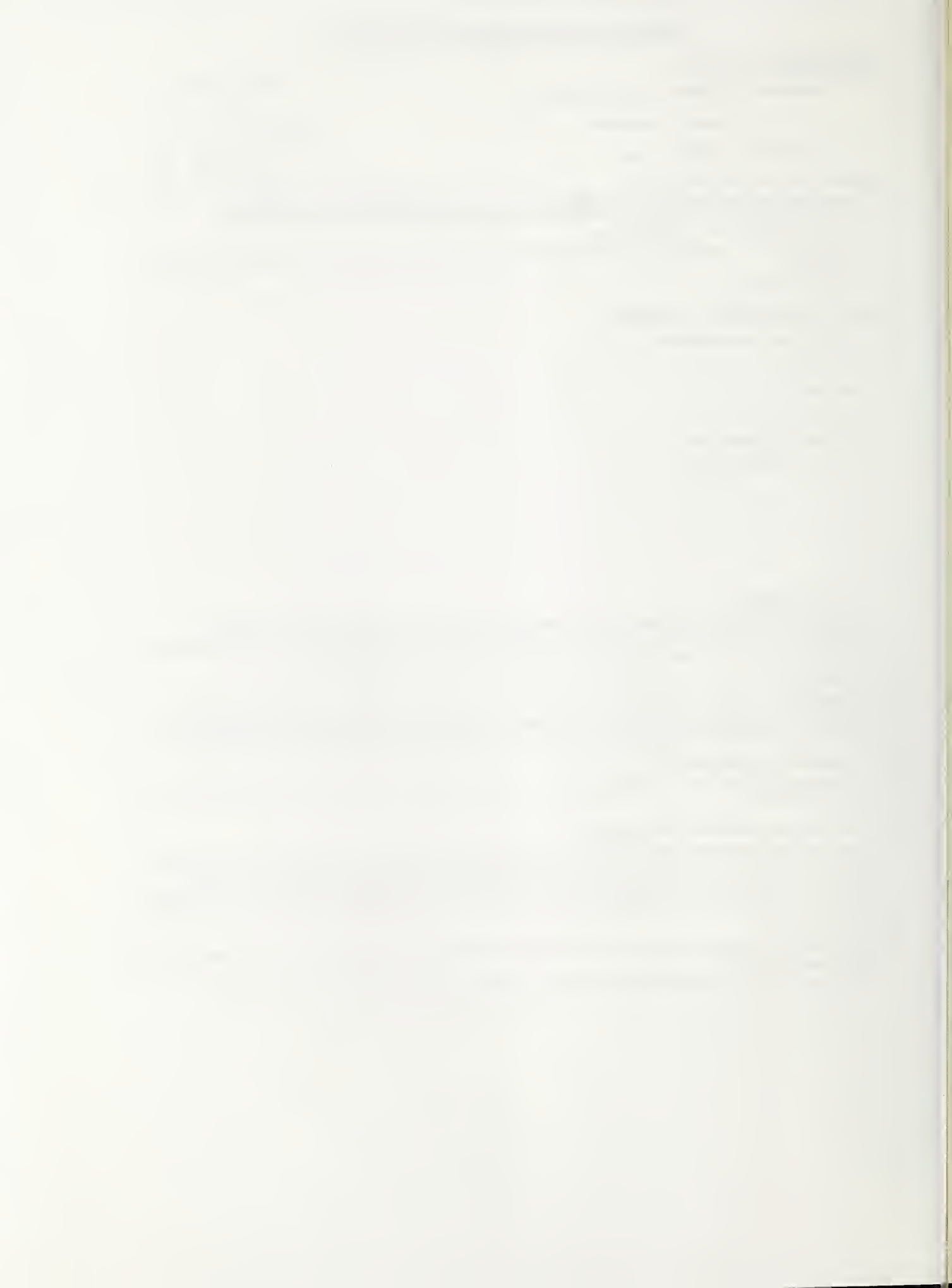
Seed Tree with Reserves using helicopter yarding, use upper and lower diameter limit Rx for hemlock and cedar. Reserve and plant 2 large spruce every 10 acres. Initial managed stand will have 3 cohorts; 1) Young trees from regeneration harvest. 2) Small residuals left from lower dia. limit harvest 3) Large residual trees with high wildlife value. Over time, it is expected that a 2-aged stand will develop as large trees are removed through senescence and wind snap or by windthrow

#### D. UNIT DESIGN:

Unit is planned for helicopter yarding, as it is isolated above the backline of an old harvest unit and is not accessible by road due to steep topography.

Unit boundaries are parallel to southeast winds and due to oblique viewing angle will meet the visual objective.





CRANE and ROWAN MOUNTAIN UNIT PLAN

VCU-UNIT.ALT 400-11.5

Management Prescription: Timber Production

Natural Stand Condition: Old growth

Desired Future Condition

USGS 1/4 QUAD MAP #: PTA D1 SW

Aerial Photo: 77 Flight# 5 Photo# 72

Acres Even Aged: 0

Acres 2-Aged: 0

Acres Uneven Aged 0

Volume(MBF) 0

I. RESOURCE CONCERNS/OPPORTUNITIES - UNIT MANAGEMENT OBJECTIVES

Watershed exceeds 20% harvest in 30 years - conduct watershed analysis  
Unit not included in alternative 5  
No streams in unit.

II. IMPLEMENTATION ACTIVITIES

A. ECOSYSTEMS MANAGEMENT:

- 1. Vegetation:  
oldgrowth
- 2. Aquatic Habitat:  
No Class I/II streams in Unit.  
No Class III streams in Unit.

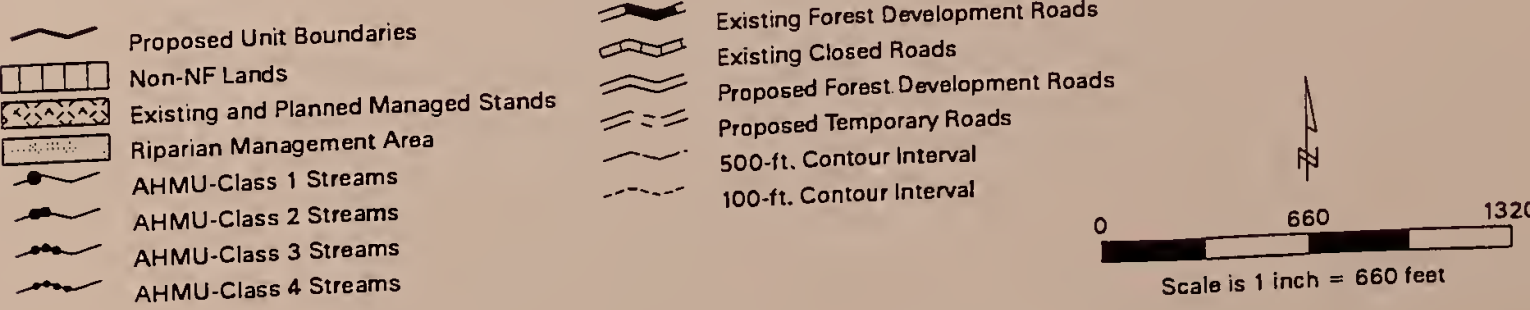
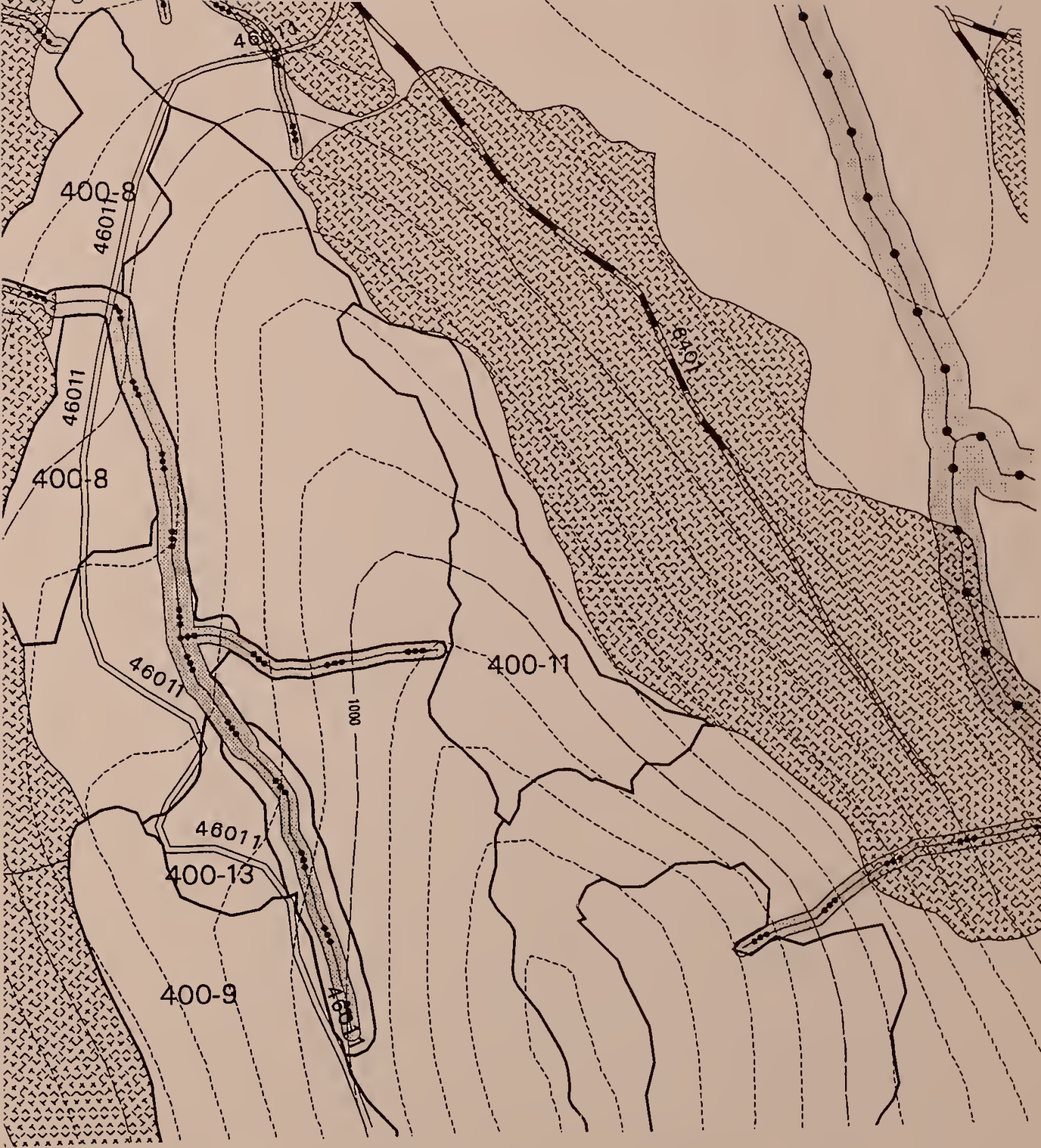
- 3. Wildlife Habitat:
- 4. Visuals:

B. TRANSPORTATION SYSTEM:

C. SILVICULTURAL PRESCRIPTION SUMMARY:

D. UNIT DESIGN:

Crane/Rowan Timber Harvest Unit 400-11







## CRANE and ROWAN MOUNTAIN UNIT PLAN

**VCU-UNIT.ALT 400-12.2**

Management Prescription: Timber Production

Acres Even Aged: 79

Natural Stand Condition: Understory Reinitiation/Old Growth

Acres 2-Aged: 0

Desired Future Condition Even-aged

Acres Uneven Aged 0

Volume(MBF) 2654.4

USGS 1/4 QUAD MAP #: PTA D1 SW

Aerial Photo: 77

Flight# 5

Photo#

71

### I. RESOURCE CONCERNS/OPPORTUNITIES - UNIT MANAGEMENT OBJECTIVES

Watershed exceeds 20% harvest in 30 years - conduct watershed analysis  
Access "difficult" component of the ASQ - develop techniques for managing this component.  
Winds from the southeast predominate - incorporate disturbance ecology principles.  
Two class III streams along unit boundary - maintain stream channel stability.

### II. IMPLEMENTATION ACTIVITIES

#### A. ECOSYSTEMS MANAGEMENT:

##### 1. Vegetation:

Top of unit is Understory Reinitiation with many stilt rooted spruce. Lower portion is Old Growth with no apparent cohorts. Managed stand will be even-aged.

##### 2. Aquatic Habitat:

Class III: No programmed commercial timber harvest within the V-notch (side-slope break). Manage an appropriate distance beyond the slope break for windfirmness. (BMP 12.6 Riparian Area Designation and Protection; BMP 13.16 Stream Channel Protection) Both Class III streams along the unit are in the High Gradient Contained Process Group. Manage the area within 120 feet of the V-notch to provide for windfirmness. Windthrow has been recorded in the area from SE winds.

A Class IV stream may extend into the unit from the Class III at the north end of the unit. Provide adequate deflection to minimize soil disturbance by using tailtrees on ridge adjacent to the stream. Partially suspend logs over the stream. (BMP 13.16 Stream Channel Protection)

##### 3. Wildlife Habitat:

Unit is in medium/low deer HSI value and high/medium Marten HIS value. North facing slope above 1200 feet in elevation.

##### 4. Visuals:

#### B. TRANSPORTATION SYSTEM:

Unit is not accessible by road due to steep topography. Planned helicopter unit will use landing on existing road 6401. No new roads needed.

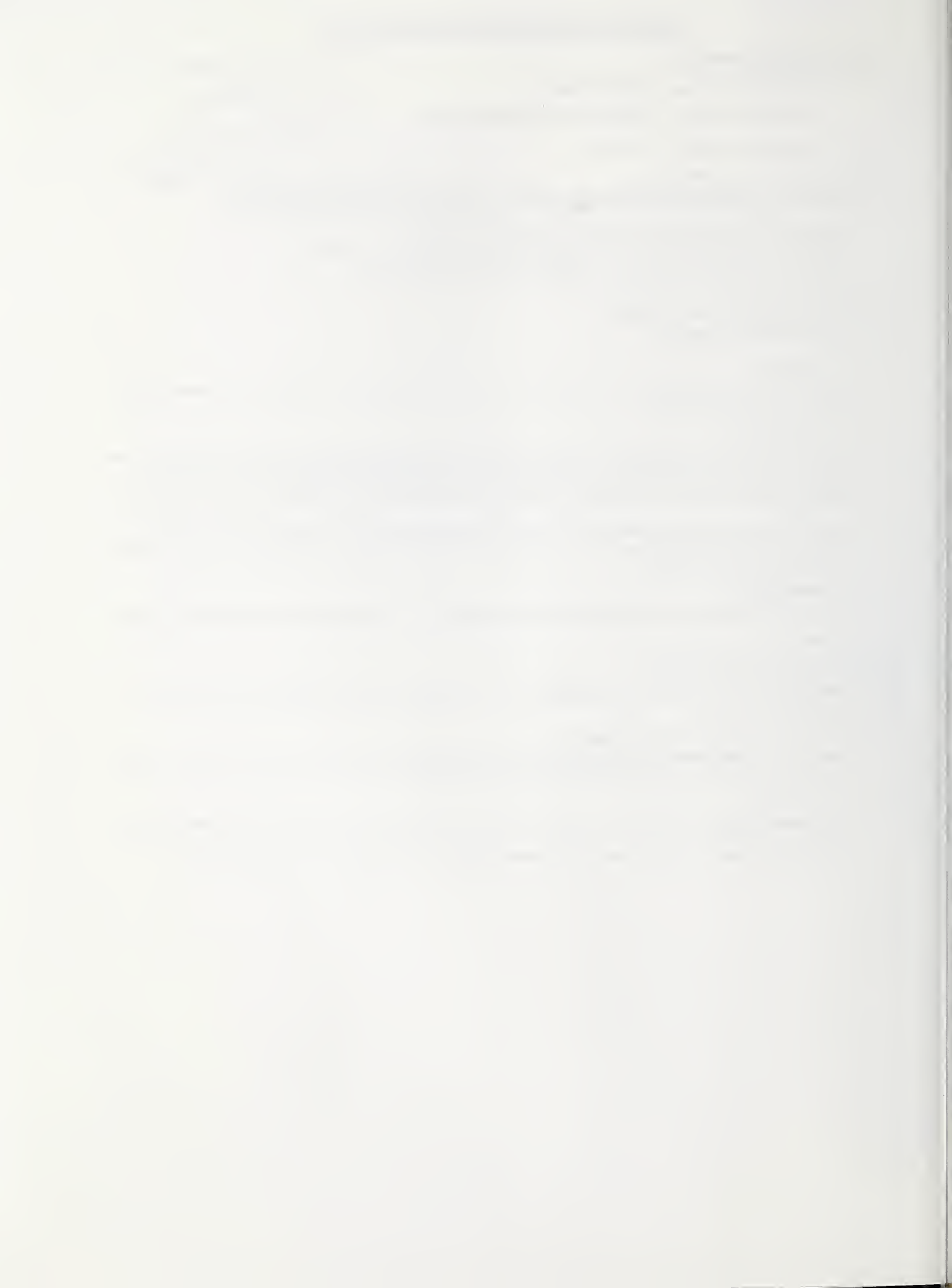
#### C. SILVICULTURAL PRESCRIPTION SUMMARY:

Clearcut for natural regeneration, use helicopter yarding, manage as even-aged stand, certify regeneration, pre-commercial thin to increase diameter growth and to provide light for shrubs and forbs.

#### D. UNIT DESIGN:

Unit is planned for helicopter yarding. Unit is isolated above the backline of an old harvest unit and is not accessible by road due to steep topography.

Unit is oriented parallel to southeast winds. North boundary is located on a topographic break to minimize windthrow.



## CRANE and ROWAN MOUNTAIN UNIT PLAN

**VCU-UNIT.ALT** 400-12.3

Management Prescription: Timber Production

Acres Even Aged: 0

Natural Stand Condition: Understory Reinitiation/Old Growth

Acres 2-Aged: 39

Desired Future Condition 2-aged / Uneven-Aged

Acres Uneven Aged 40

Volume(MBF) 1141

USGS 1/4 QUAD MAP #: PTA D1 SW

Aerial Photo: 77

Flight# 5

Photo#

71

### I. RESOURCE CONCERNS/OPPORTUNITIES - UNIT MANAGEMENT OBJECTIVES

Watershed exceeds 20% harvest in 30 years - conduct watershed analysis

Access "difficult" component of the ASQ - develop techniques for managing this component.

Unit is in Moderate probability wind zone - incorporate disturbance ecology principles.

Two class III streams along unit boundary - maintain stream channel stability.

Wildlife Habitat - Maintain legacy structure in unit where possible for prey species habitat through alternative silvicultural prescription.

### II. IMPLEMENTATION ACTIVITIES

#### A. ECOSYSTEMS MANAGEMENT:

##### 1. Vegetation:

Top of unit is Understory Reinitiation with many stilt rooted spruce. Lower portion is Old Growth with no apparent cohorts.

##### 2. Aquatic Habitat:

Class III: No programmed commercial timber harvest within the V-notch (side-slope break). Manage an appropriate distance beyond the slope break for windfirmness. (BMP 12.6 Riparian Area Designation and Protection; BMP 13.16 Stream Channel Protection) Both Class III streams along the unit are in the High Gradient Contained Process Group. Manage the area within 120 feet of the V-notch to provide for windfirmness. Windthrow has been recorded in the area from SE winds.

Class IV stream may extend into the unit from the Class III at the north end of the unit. Provide adequate deflection to minimize soil disturbance by using tailtrees on ridge adjacent to the stream. Partially suspend logs over the stream. (BMP 13.16 Stream Channel Protection)

##### 3. Wildlife Habitat:

Unit is in medium/low deer HSI value and high/medium Marten HIS value. North facing slope above 1200 feet in elevation. Retain multi-cohort stand structure and legacy to provide necessary habitat characteristics for forest dwelling species. Unit will be harvested using alternative silvicultural prescriptions. This should exceed TLMP S&Gs.

##### 4. Visuals:

#### B. TRANSPORTATION SYSTEM:

Unit is not accessible by road due to steep topography. Planned helicopter unit will use landing on existing road 6401. No new roads needed.

#### C. SILVICULTURAL PRESCRIPTION SUMMARY:

Seed Tree with Reserves using helicopter yarding, use upper and lower diameter limit Rx for hemlock and cedar. Reserve and plant 2 large spruce every 10 acres. Initial managed stand will have 3 cohorts; 1) Young trees from regeneration harvest. 2) Small residuals left from lower dia. limit harvest 3) Large residual trees with high wildlife value. Wind disturbance over time will return upper part of unit to 2-aged through senescence of larger diameter trees by wind snap. Lower part of unit will remain uneven-aged as it is more sheltered from the wind.

#### D. UNIT DESIGN:

Unit is planned for helicopter yarding. Unit is isolated above the backline of an old harvest unit and is not accessible by road due to steep topography.

Unit is oriented parallel to southeast winds. North boundary is located on a topographic break to minimize windthrow.





## CRANE and ROWAN MOUNTAIN UNIT PLAN

**VCU-UNIT.ALT** 400-12.4

Acres Even Aged: 0

Management Prescription: Timber Production

Acres 2-Aged: 39

Natural Stand Condition: Understory Reinitiation / Old Growth

Acres Uneven Aged 40

Desired Future Condition 2-aged / Uneven-Aged

Volume(MBF) 1141

USGS 1/4 QUAD MAP #: PTA D1 SW

Aerial Photo: 77

Flight# 5

Photo#

71

### I. RESOURCE CONCERNS/OPPORTUNITIES - UNIT MANAGEMENT OBJECTIVES

See unit card 400-22.4 for combination unit

Wildlife Habitat - Maintain legacy structure in unit where possible for prey species habitat through alternative silvicultural prescription.

Two class III streams along unit boundary - maintain stream channel stability.

### II. IMPLEMENTATION ACTIVITIES

#### A. ECOSYSTEMS MANAGEMENT:

##### 1. Vegetation:

Top of unit is Understory Reinitiation with many stilt rooted spruce. Lower portion is Old Growth with no apparent cohorts.

##### 2. Aquatic Habitat:

Class III: No programmed commercial timber harvest within the V-notch (side-slope break). Manage an appropriate distance beyond the slope break for windfirmness. (BMP 12.6 Riparian Area Designation and Protection; BMP 13.16 Stream Channel Protection) Both Class III streams along the unit are in the High Gradient Contained Process Group. Manage the area within 120 feet of the V-notch to provide for windfirmness. Windthrow has been recorded in the area from SE winds.

Class IV stream may extend into the unit from the Class III at the north end of the unit. Provide adequate deflection to minimize soil disturbance by using tailtrees on ridge adjacent to the stream. Partially suspend logs over the stream. (BMP 13.16 Stream Channel Protection)

##### 3. Wildlife Habitat:

Unit is in medium/low deer HSI value and high/medium Marten HIS value. North facing slope above 1200 feet in elevation. Retain multi-cohort stand structure and legacy to provide necessary habitat characteristics for forest dwelling species. Unit will be harvested using alternative silvicultural prescriptions. This should exceed TLMP S&Gs.

##### 4. Visuals:

#### B. TRANSPORTATION SYSTEM:

Unit is not accessible by road due to steep topography. Planned helicopter unit will use landing on existing road 6401. No new roads needed.

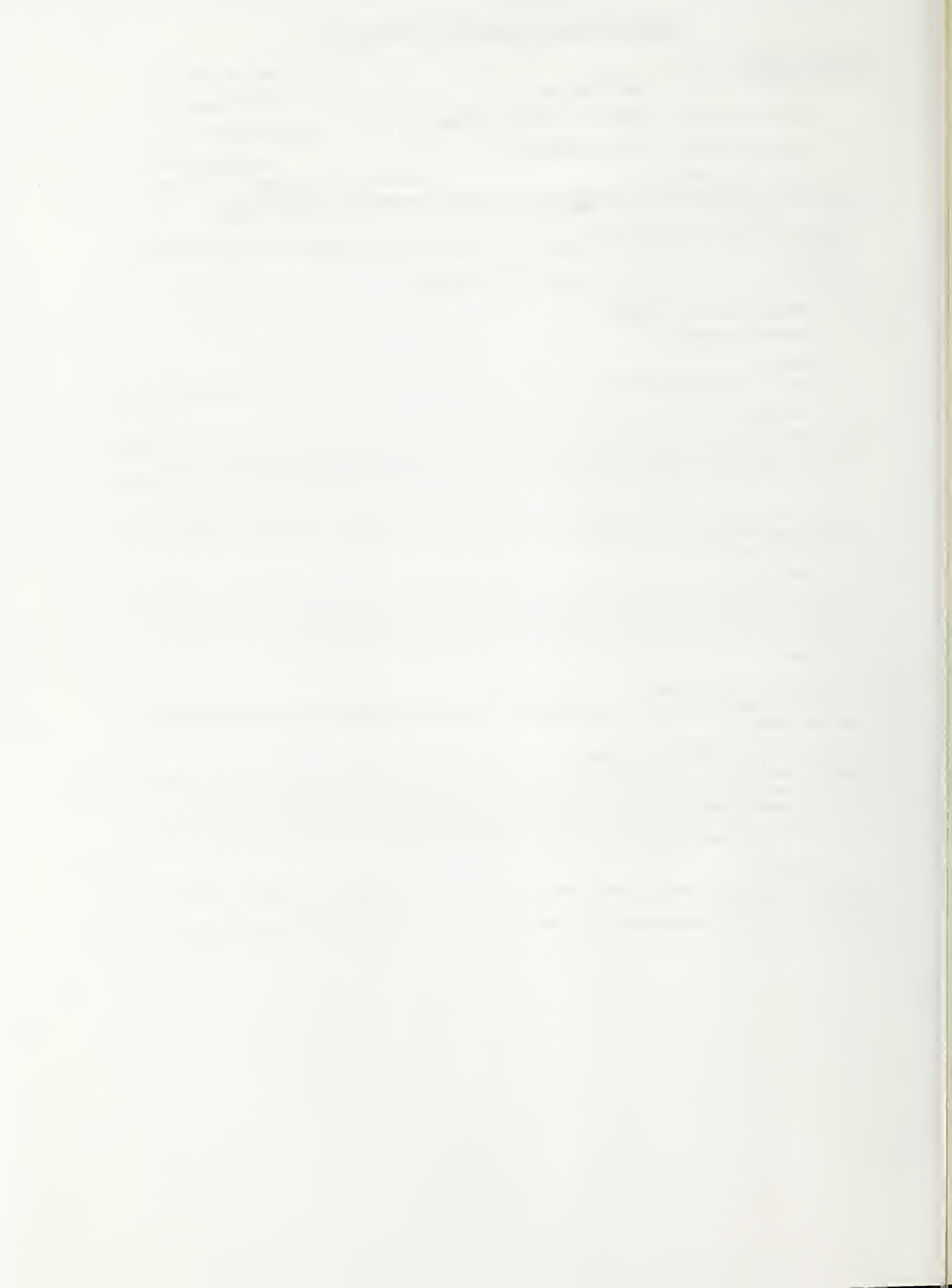
#### C. SILVICULTURAL PRESCRIPTION SUMMARY:

Seed Tree with Reserves using helicopter yarding, use upper and lower diameter limit Rx for hemlock and cedar. Reserve and plant 2 large spruce every 10 acres. Initial managed stand will have 3 cohorts; 1) Young trees from regeneration harvest. 2) Small residuals left from lower dia. limit harvest 3) Large residual trees with high wildlife value. Wind disturbance over time will return upper part of unit to 2-aged through senescence of larger diameter trees by wind snap. Lower part of unit will remain uneven-aged as it is more sheltered from the wind.

#### D. UNIT DESIGN:

Unit is planned for helicopter yarding. Unit is isolated above the backline of an old harvest unit and is not accessible by road due to steep topography.

Unit is oriented parallel to southeast winds. North boundary is located on a topographic break to minimize windthrow.





CRANE and ROWAN MOUNTAIN UNIT PLAN

**VCU-UNIT.ALT** 400-12.5

Management Prescription: Timber Production  
Natural Stand Condition: Understory Reinitiation/Old Growth  
Desired Future Condition

Acres Even Aged: 0  
Acres 2-Aged: 0  
Acres Uneven Aged: 0  
Volume(MBF): 0  
Aerial Photo: 77 Flight# 5 Photo# 71

USGS 1/4 QUAD MAP #: PTA D1 SW

**I. RESOURCE CONCERNS/OPPORTUNITIES - UNIT MANAGEMENT OBJECTIVES**

Watershed exceeds 20% harvest in 30 years - conduct watershed analysis  
Unit not included in alternative 5  
Two class III streams along unit boundary - maintain stream channel stability.

**II. IMPLEMENTATION ACTIVITIES**

**A. ECOSYSTEMS MANAGEMENT:**

- 1. Vegetation:
- 2. Aquatic Habitat:

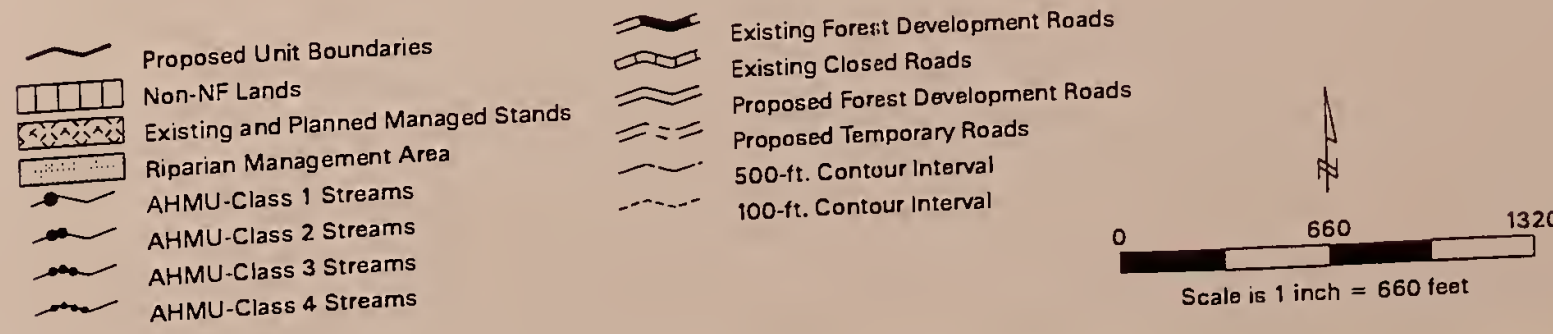
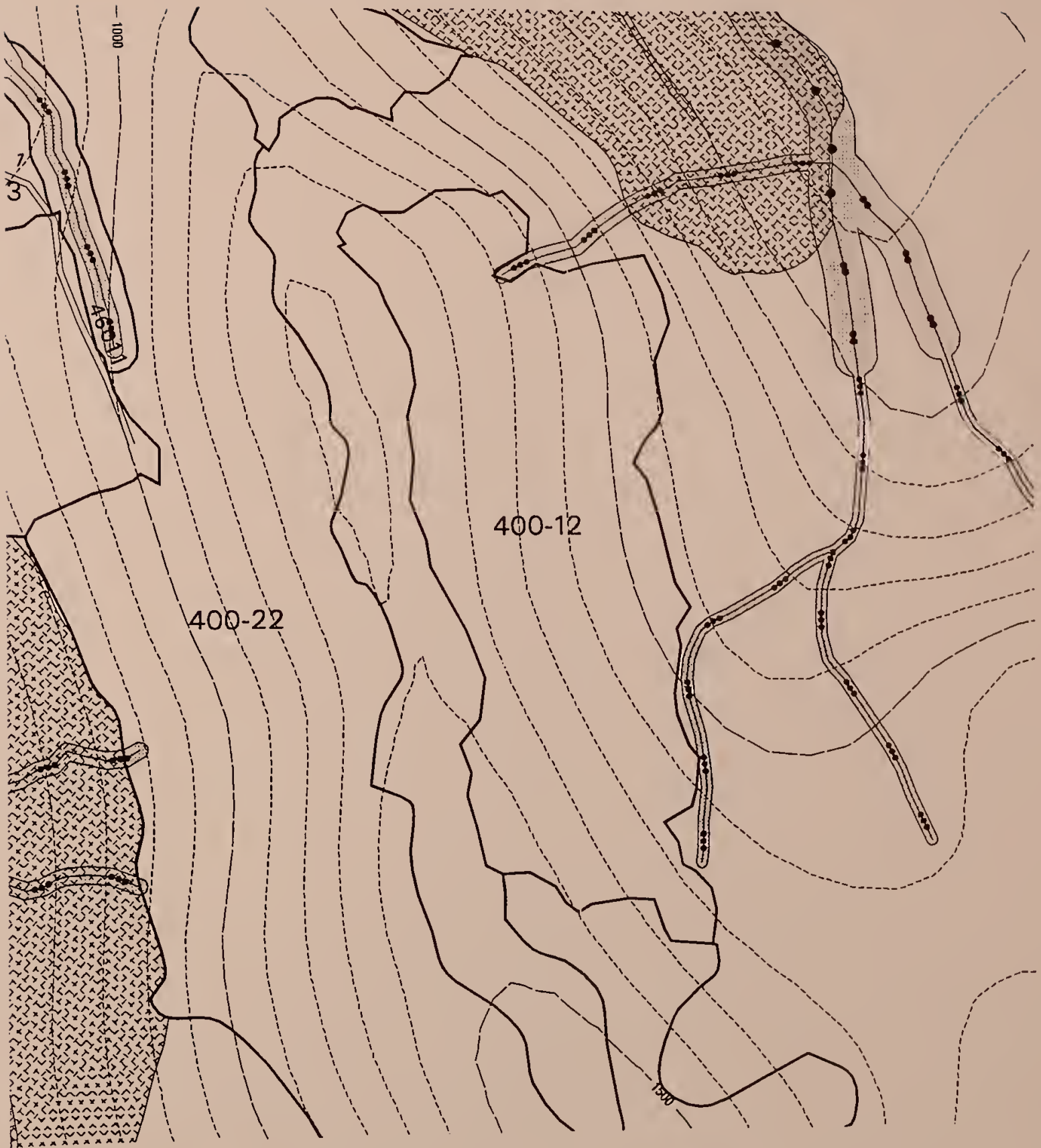
- 3. Wildlife Habitat:
- 4. Visuals:

**B. TRANSPORTATION SYSTEM:**

**C. SILVICULTURAL PRESCRIPTION SUMMARY:**

**D. UNIT DESIGN:**

Crane/Rowan Timber Harvest Unit 400-12





# CRANE and ROWAN MOUNTAIN UNIT PLAN

**VCU-UNIT.ALT** 400-18.2

Management Prescription: Timber Production

Acres Even Aged: 59

Natural Stand Condition: Understory Reinitiation

Acres 2-Aged: 0

Desired Future Condition Even aged

Acres Uneven Aged 0

Volume(MBF) 1982.4

USGS 1/4 QUAD MAP #: PTA D1 SW

Aerial Photo: 77 Flight# 4 Photo# 26

## I. RESOURCE CONCERNS/OPPORTUNITIES - UNIT MANAGEMENT OBJECTIVES

Access "difficult" component of the ASQ - develop techniques for managing this component.

Class III stream west of unit - maintain stream channel stability.

Unit is visible from saltwater - VQO is modification.

## II. IMPLEMENTATION ACTIVITIES

### A. ECOSYSTEMS MANAGEMENT:

#### 1. Vegetation:

Manage as even-aged stand, clear-cut for natural regeneration, certify natural regeneration, pre-commercial thin to maintain healthy stand.

#### 2. Aquatic Habitat:

Class III: No programmed commercial timber harvest within the V-notch (side-slope break). Manage an appropriate distance beyond the slope break for windfirmness. (BMP 12.6 Riparian Area Designation and Protection; BMP 13.16 Stream Channel Protection) Class III stream to the west is in the High Gradient Contained Process Group. Manage the area within 120 feet of the V-notch for windfirmness. Even aged windthrow stand nearby appears to have been from SW winds.

#### 3. Wildlife Habitat:

Unit is in medium deer HSI value and high Marten HIS value. West facing slope below 1100 feet in elevation.

#### 4. Visuals:

This landscape is viewed in the middleground distance from outside Security and Saginaw Bays. Past timber harvest dominates areas seen from these bays.

Unit meets modification VQO as designed.

### B. TRANSPORTATION SYSTEM:

Unit is not accessible by road due to steep topography. Planned helicopter unit will use landing on existing road 6425. No new roads needed.

### C. SILVICULTURAL PRESCRIPTION SUMMARY:

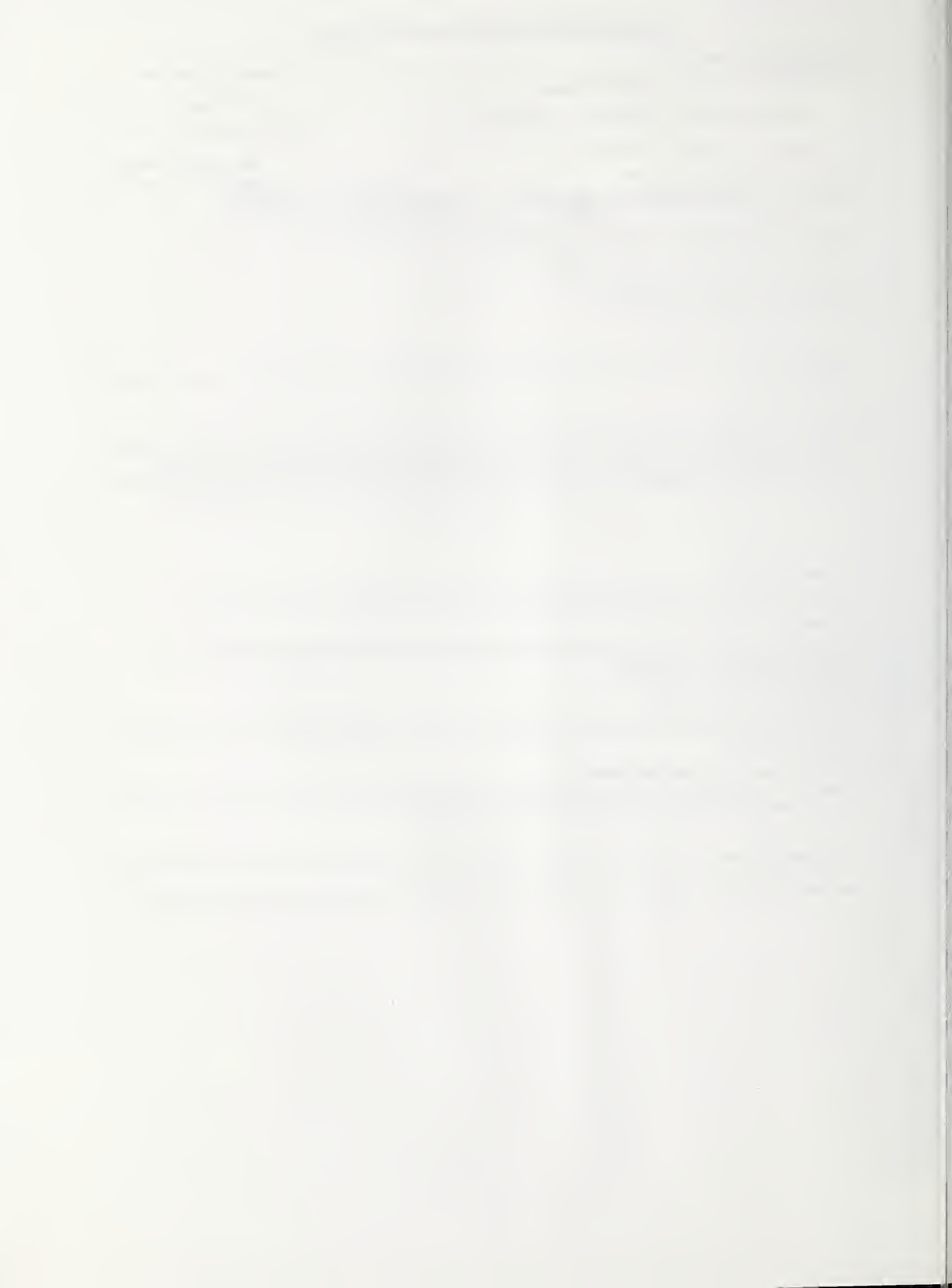
Clearcut for natural regeneration, use helicopter yarding, manage as even-aged stand, certify regeneration, pre-commercial thin to increase diameter growth and to provide light for shrubs and forbs.

### D. UNIT DESIGN:

Unit is planned for helicopter yarding, as it is isolated above the backline of an old harvest unit and is not accessible by road due to steep topography.

Northwest portion of the unit adjacent to an old windthrow area. Northeast area is adjacent to older existing harvest unit.





# CRANE and ROWAN MOUNTAIN UNIT PLAN

**VCU-UNIT.ALT 400-18.3**

Management Prescription: Timber Production

Acres Even Aged: 0

Natural Stand Condition: Understory Reinitiation

Acres 2-Aged: 59

Desired Future Condition 2-aged

Acres Uneven Aged 0

Volume(MBF) 1121

USGS 1/4 QUAD MAP #: PTA D1 SW

Aerial Photo: 77

Flight# 4

Photo#

26

## I. RESOURCE CONCERNS/OPPORTUNITIES - UNIT MANAGEMENT OBJECTIVES

Access "difficult" component of the ASQ - develop techniques for managing this component.

Class III stream west of unit - maintain stream channel stability.

Unit is visible from saltwater - VQO is modification.

Wildlife Habitat - Maintain legacy structure in unit where possible for prey species habitat through alternative silvicultural prescription.

## II. IMPLEMENTATION ACTIVITIES

### A. ECOSYSTEMS MANAGEMENT:

#### 1. Vegetation:

Maintain a heterogeneous multicohort stand structure. Managed stand will have 3 cohorts; 1) Young component from regeneration harvest. 2) Small residuals left from lower dia. limit harvest 3) Large residual trees with high wildlife value.

#### 2. Aquatic Habitat:

Class III: No programmed commercial timber harvest within the V-notch (side-slope break). Manage an appropriate distance beyond the slope break for windfirmness. (BMP 12.6 Riparian Area Designation and Protection; BMP 13.16 Stream Channel Protection) Class III stream to the west is in the High Gradient Contained Process Group. Manage the area within 120 feet of the V-notch for windfirmness. Even aged windthrow stand nearby appears to have been from SW winds.

#### 3. Wildlife Habitat:

Unit is in medium deer HSI value and high Marten HIS value. West facing slope below 1100 feet in elevation. Retain multi-cohort stand structure and legacy to provide necessary habitat characteristics for forest dwelling species. Entire unit will be harvested using an alternative silvicultural prescription (See below). This should exceed the TLMP Standards and Guidelines for the entire the unit.

#### 4. Visuals:

This landscape is viewed in the middleground distance from outside Security and Saginaw Bays. Past timber harvest dominates areas seen from these bays.

Unit meets partial retention VQO as designed.

### B. TRANSPORTATION SYSTEM:

Unit is not accessible by road due to steep topography. Planned helicopter unit will use landing on existing road 6425. No new roads needed.

### C. SILVICULTURAL PRESCRIPTION SUMMARY:

Seed Tree with Reserves using helicopter yarding, use upper and lower diameter limit Rx for hemlock and cedar. Reserve and plant 2 large spruce every 10 acres. Initial managed stand will have 3 cohorts; 1) Young trees from regeneration harvest. 2) Small residuals left from lower dia. limit harvest 3) Large residual trees with high wildlife value. Over time, it is expected that a 2-aged stand will develop as large trees are removed through senescence and wind snap or by windthrow

### D. UNIT DESIGN:

Unit is planned for helicopter yarding, as it is isolated above the backline of an old harvest unit and is not accessible by road due to steep topography.

Northwest portion of the unit adjacent to an old windthrow area. Northeast area is adjacent to older existing harvest unit.





# CRANE and ROWAN MOUNTAIN UNIT PLAN

**VCU-UNIT.ALT** 400-18.4

Management Prescription: Timber Production

Acres Even Aged: 0

Natural Stand Condition: Understory Reinitiation

Acres 2-Aged: 59

Desired Future Condition 2-aged

Acres Uneven Aged 0

Volume(MBF) 1121

USGS 1/4 QUAD MAP #: PTA D1 SW

Aerial Photo: 77

Flight# 4

Photo#

26

## I. RESOURCE CONCERNS/OPPORTUNITIES - UNIT MANAGEMENT OBJECTIVES

Access "difficult" component of the ASQ - develop techniques for managing this component.

Class III stream west of unit - maintain stream channel stability.

Unit is visible from saltwater - VQO is modification.

Wildlife Habitat - Maintain legacy structure in unit where possible for prey species habitat through alternative silvicultural prescription.

## II. IMPLEMENTATION ACTIVITIES

### A. ECOSYSTEMS MANAGEMENT:

#### 1. Vegetation:

Maintain a heterogeneous multicohort stand structure. Managed stand will have 3 cohorts; 1) Young component from regeneration harvest. 2) Small residuals left from lower dia. limit harvest 3) Large residual trees with high wildlife value.

#### 2. Aquatic Habitat:

Class III: No programmed commercial timber harvest within the V-notch (side-slope break). Manage an appropriate distance beyond the slope break for windfirmness. (BMP 12.6 Riparian Area Designation and Protection; BMP 13.16 Stream Channel Protection) Class III stream to the west is in the High Gradient Contained Process Group. Manage the area within 120 feet of the V-notch for windfirmness. Even aged windthrow stand nearby appears to have been from SW winds.

#### 3. Wildlife Habitat:

Unit is in medium deer HSI value and high Marten HIS value. West facing slope below 1100 feet in elevation. Retain multi-cohort stand structure and legacy to provide necessary habitat characteristics for forest dwelling species. Entire unit will be harvested using an alternative silvicultural prescription (See below). This should exceed the TLMP Standards and Guidelines for the entire the unit.

#### 4. Visuals:

This landscape is viewed in the middleground distance from outside Security and Saginaw Bays. Past timber harvest dominates areas seen from these bays.

Unit meets partial retention VQO as designed.

### B. TRANSPORTATION SYSTEM:

Unit is not accessible by road due to steep topography. Planned helicopter unit will use landing on existing road 6425. No new roads needed.

### C. SILVICULTURAL PRESCRIPTION SUMMARY:

Seed Tree with Reserves using helicopter yarding, use upper and lower diameter limit Rx for hemlock and cedar. Reserve and plant 2 large spruce every 10 acres. Initial managed stand will have 3 cohorts; 1) Young trees from regeneration harvest. 2) Small residuals left from lower dia. limit harvest 3) Large residual trees with high wildlife value. Over time, it is expected that a 2-aged stand will develop as large trees are removed through senescence and wind snap or by windthrow

### D. UNIT DESIGN:

Unit is planned for helicopter yarding, as it is isolated above the backline of an old harvest unit and is not accessible by road due to steep topography.

Northwest portion of the unit adjacent to an old windthrow area. Northeast area is adjacent to older existing harvest unit.





# CRANE and ROWAN MOUNTAIN UNIT PLAN

**VCU-UNIT.ALT 400-18.5**

Management Prescription: Timber Production

Natural Stand Condition: Understory Reinitiation

Desired Future Condition Even aged

Acres Even Aged: 59

Acres 2-Aged: 0

Acres Uneven Aged 0

Volume(MBF) 1982.4

Aerial Photo: 77

Flight# 4

Photo# 26

USGS 1/4 QUAD MAP #: PTA D1 SW

## I. RESOURCE CONCERNS/OPPORTUNITIES - UNIT MANAGEMENT OBJECTIVES

Access "difficult" component of the ASQ - develop techniques for managing this component.  
Class III stream west of unit - maintain stream channel stability.  
Unit is visible from saltwater - VQO is modification.

## II. IMPLEMENTATION ACTIVITIES

### A. ECOSYSTEMS MANAGEMENT:

#### 1. Vegetation:

Manage as even-aged stand, clear-cut for natural regeneration, certify natural regeneration, pre-commercial thin to maintain healthy stand.

#### 2. Aquatic Habitat:

Class III: No programmed commercial timber harvest within the V-notch (side-slope break). Manage an appropriate distance beyond the slope break for windfirmness. (BMP 12.6 Riparian Area Designation and Protection; BMP 13.16 Stream Channel Protection) Class III stream to the west is in the High Gradient Contained Process Group. Manage the area within 120 feet of the V-notch for windfirmness. Even aged windthrow stand nearby appears to have been from SW winds.

#### 3. Wildlife Habitat:

Unit is in medium deer HSI value and high Marten HIS value. West facing slope below 1100 feet in elevation.

#### 4. Visuals:

This landscape is viewed in the middleground distance from outside Security and Saginaw Bays. Past timber harvest dominates areas seen from these bays.  
Unit meets modification VQO as designed.

### B. TRANSPORTATION SYSTEM:

Unit is not accessible by road due to steep topography. Planned helicopter unit will use landing on existing road 6425. No new roads needed.

### C. SILVICULTURAL PRESCRIPTION SUMMARY:

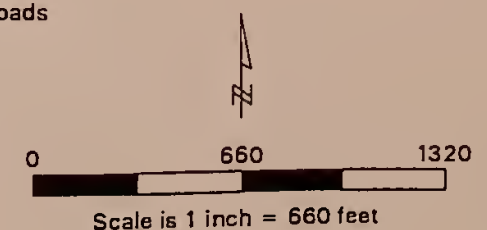
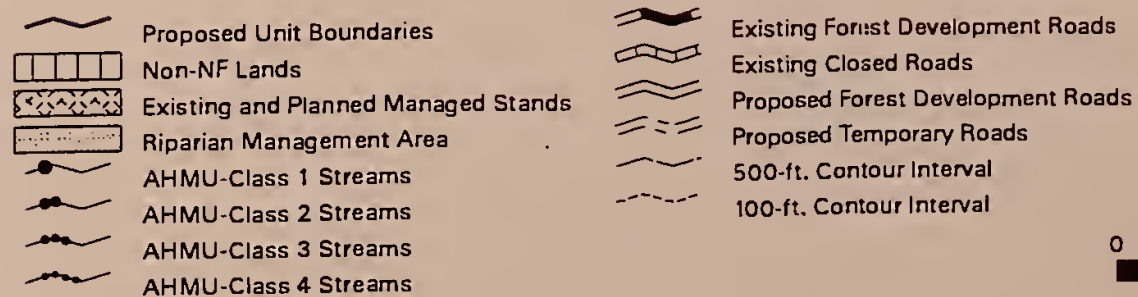
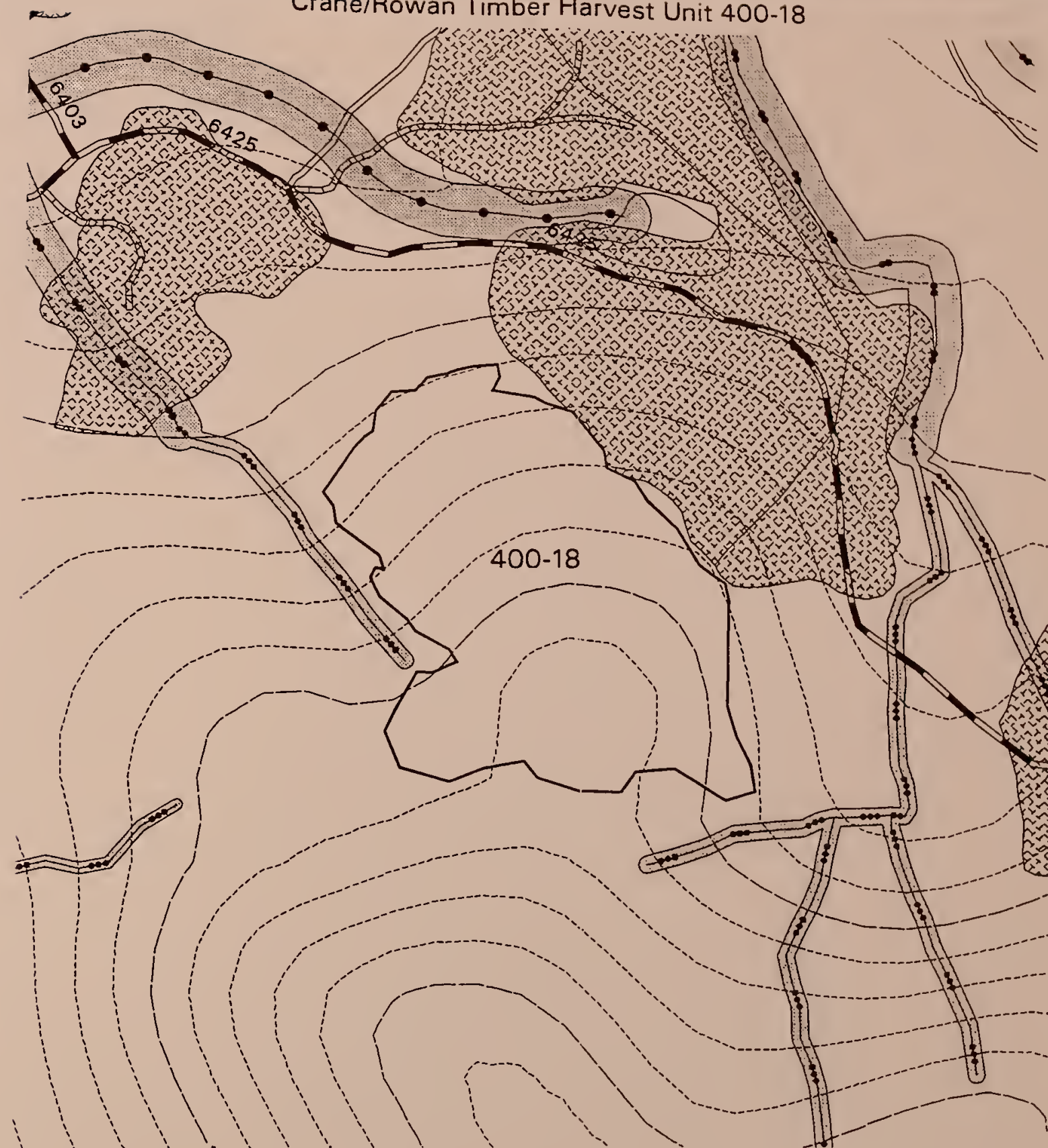
Clearcut for natural regeneration, use helicopter yarding, manage as even-aged stand, certify regeneration, pre-commercial thin to increase diameter growth and to provide light for shrubs and forbs.

### D. UNIT DESIGN:

Unit is planned for helicopter yarding, as it is isolated above the backline of an old harvest unit and is not accessible by road due to steep topography.

Northwest portion of the unit adjacent to an old windthrow area. Northeast area is adjacent to older existing harvest unit.

## Crane/Rowan Timber Harvest Unit 400-18







## CRANE and ROWAN MOUNTAIN UNIT PLAN

**VCU-UNIT.ALT** 400-22.2

Management Prescription: Timber Production

Natural Stand Condition:

Desired Future Condition

Acres Even Aged:

Acres 2-Aged: 0

Acres Uneven Aged

Volume(MBF)

USGS 1/4 QUAD MAP #:

Aerial Photo: 0

Flight#

Photo#

0

### I. RESOURCE CONCERNS/OPPORTUNITIES - UNIT MANAGEMENT OBJECTIVES

Unit not in alternative 2

### II. IMPLEMENTATION ACTIVITIES

#### A. ECOSYSTEMS MANAGEMENT:

1. Vegetation:
2. Aquatic Habitat:

3. Wildlife Habitat:

4. Visuals:

#### B. TRANSPORTATION SYSTEM:

#### C. SILVICULTURAL PRESCRIPTION SUMMARY:

#### D. UNIT DESIGN:





## CRANE and ROWAN MOUNTAIN UNIT PLAN

**VCU-UNIT.ALT** 400-22.3

Management Prescription: Timber Production

Natural Stand Condition:

Desired Future Condition

Acres Even Aged: 0

Acres 2-Aged: 0

Acres Uneven Aged 0

Volume(MBF) 0

USGS 1/4 QUAD MAP #:

Aerial Photo: 0

Flight#

Photo#

0

### I. RESOURCE CONCERNS/OPPORTUNITIES - UNIT MANAGEMENT OBJECTIVES

Unit not in alternative 3

### II. IMPLEMENTATION ACTIVITIES

#### A. ECOSYSTEMS MANAGEMENT:

1. Vegetation:

2. Aquatic Habitat:

3. Wildlife Habitat:

4. Visuals:

#### B. TRANSPORTATION SYSTEM:

#### C. SILVICULTURAL PRESCRIPTION SUMMARY:

#### D. UNIT DESIGN:



# CRANE and ROWAN MOUNTAIN UNIT PLAN

**VCU-UNIT.ALT** 400-22.4

Management Prescription: Timber Production

Acres Even Aged: 0

Natural Stand Condition: Understory Reinitiation

Acres 2-Aged: 288

Desired Future Condition 2-aged

Acres Uneven Aged 0

Volume(MBF) 5472

USGS 1/4 QUAD MAP #:

Aerial Photo: 0

Flight# 0

Photo#

0

## I. RESOURCE CONCERNS/OPPORTUNITIES - UNIT MANAGEMENT OBJECTIVES

Watershed exceeds 20% harvest in 30 years - conduct watershed analysis

This unit combines units 400- 9, 11, 12, & 22 into one 2-aged unit (366 acres). All will be harvested using 2-aged seed tree with reserve silvicultural prescription (See below).

Wildlife Habitat - Maintain legacy structure in unit where possible for prey species habitat through alternative silvicultural prescription.

Several Class III streams in unit.

Class IV streams may be encountered during layout.

Unit is visible from saltwater - meet modification VQO.

## II. IMPLEMENTATION ACTIVITIES

### A. ECOSYSTEMS MANAGEMENT:

#### 1. Vegetation:

Stand wraps around top of hill. Is largely understory reinitiation with small patches of old growth.

#### 2. Aquatic Habitat:

Class III: No programmed commercial timber harvest within the V-notch (side-slope break). Manage an appropriate distance beyond the slope break for windfirmness. (BMP 12.6 Riparian Area Designation and Protection; BMP 13.16 Stream Channel Protection) Class III streams within the unit are in the High Gradient Contained Process Group. Manage the area within 120 feet for windfirmness. Southeast winds predominate.

If Class IV streams are encountered during layout, provide adequate deflection to minimize soil disturbance by using tailtrees on ridge adjacent to the stream. Partially suspend logs over the stream. (BMP 13.16 Stream Channel Protection)

#### 3. Wildlife Habitat:

Retain multi-cohort stand structure and legacy to provide necessary habitat characteristics for forest dwelling species. Unit 400-8 will be clearcut and will meet the TLMP Standards and Guidelines. The rest of the unit will be harvested using an alternative silvicultural prescription. This should exceed the TLMP Standards and Guidelines for this portion of the unit.

#### 4. Visuals:

The landscape is viewed in the middleground distance and is part of the Security Bay viewshed. Past timber harvest dominates the east Security viewshed; where landscapes are gently rolling, with valleys and ridges interspersed through the area. Landscape in west Security and the inner lagoon area rise sharply, with steep slopes creating a dramatic landscape setting. Unit as designed with 2-aged prescription achieves partial retention VQO.

### B. TRANSPORTATION SYSTEM:

Most of the unit is inaccessible by road due to steep topography. Planned helicopter unit will use landing on existing road 6402. No new roads needed.

### C. SILVICULTURAL PRESCRIPTION SUMMARY:

Seed Tree with Reserves using helicopter yarding, use upper and lower diameter limit Rx for hemlock and cedar. Reserve and plant 2 large spruce every 10 acres. Initial managed stand will have 3 cohorts; 1) Young component from regeneration harvest. 2) Small residuals left from lower dia. limit harvest 3) Large residual trees with high wildlife value. Wind disturbance over time will return parts of unit to 2-aged through removal of larger diameter trees by wind snap. Old growth parts of unit will remain uneven-aged as they are more sheltered from the wind.

### D. UNIT DESIGN:





CRANE and ROWAN MOUNTAIN UNIT PLAN

**VCU-UNIT.ALT** 400-22.5

Management Prescription: Timber Production

Natural Stand Condition:

Desired Future Condition

USGS 1/4 QUAD MAP #:

Aerial Photo: 0 Flight# Photo# 0

Acres Even Aged: 0

Acres 2-Aged: 0

Acres Uneven Aged: 0

Volume(MBF) 0

**I. RESOURCE CONCERNS/OPPORTUNITIES - UNIT MANAGEMENT OBJECTIVES**

Unit not in alternative 5

**II. IMPLEMENTATION ACTIVITIES**

**A. ECOSYSTEMS MANAGEMENT:**

1. Vegetation:

2. Aquatic Habitat:

3. Wildlife Habitat:

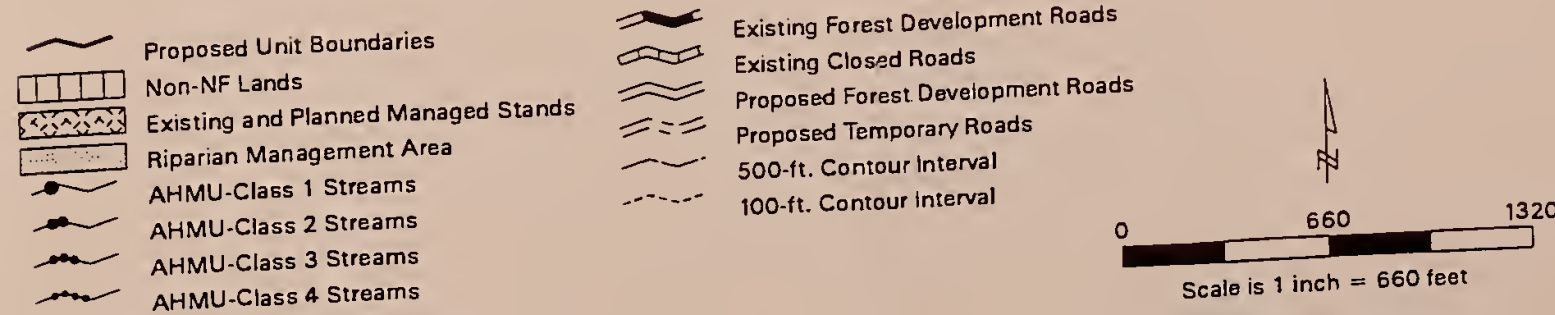
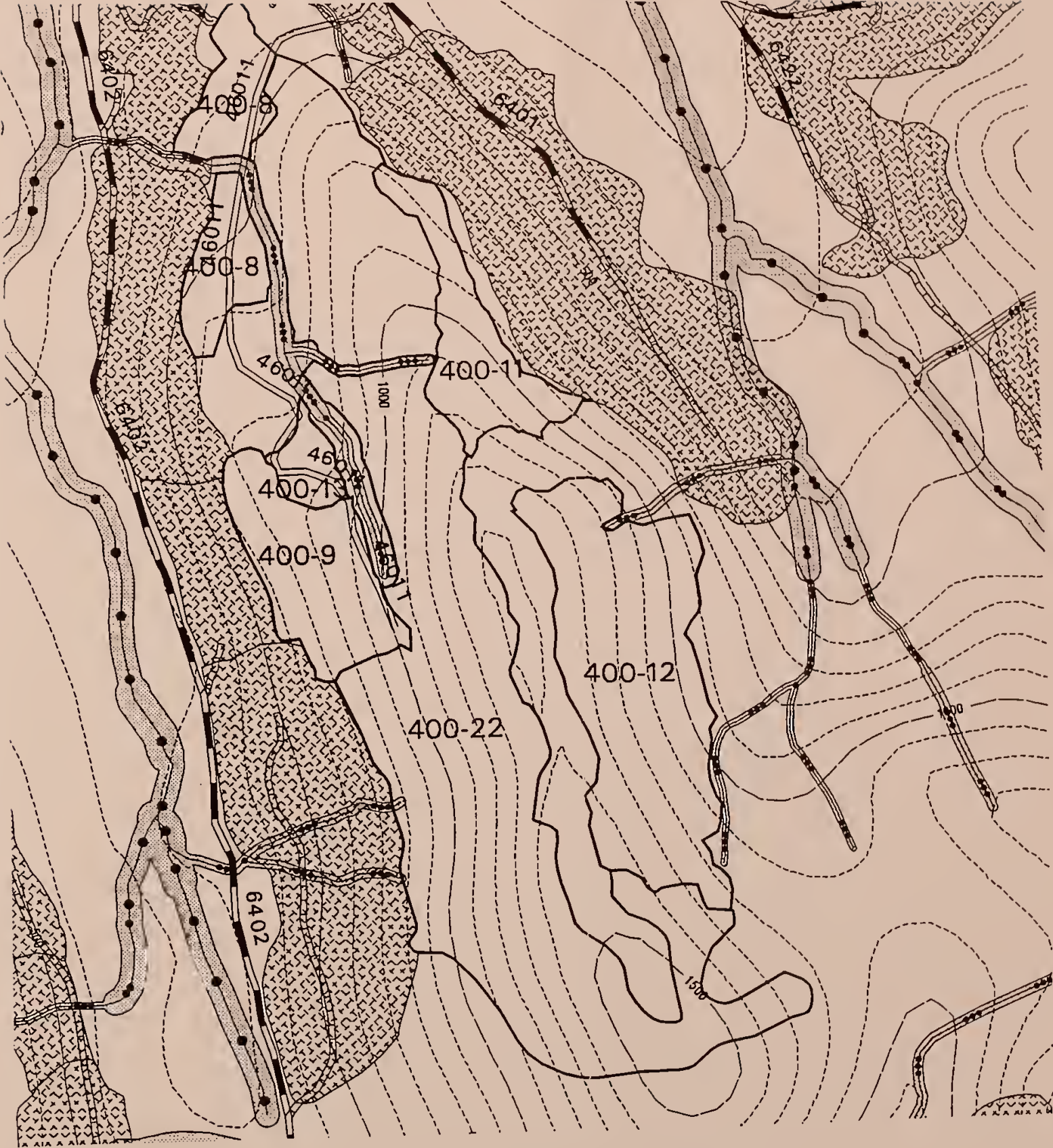
4. Visuals:

**B. TRANSPORTATION SYSTEM:**

**C. SILVICULTURAL PRESCRIPTION SUMMARY:**

**D. UNIT DESIGN:**

Crane/Rowan Timber Harvest Unit 400-22







## CRANE and ROWAN MOUNTAIN UNIT PLAN

**VCU-UNIT.ALT** 402-25.2

Management Prescription: Timber Production

Natural Stand Condition: Old Growth

Desired Future Condition Even aged

Acres Even Aged: 22

Acres 2-Aged: 0

Acres Uneven Aged 0

Volume(MBF) 739.2

USGS 1/4 QUAD MAP #: PTA C1 NW

Aerial Photo: 77

Flight# 4

Photo#

43

### I. RESOURCE CONCERNS/OPPORTUNITIES - UNIT MANAGEMENT OBJECTIVES

Unit is seen from Rowan Bay - meet VQO of Modification.

Two Class III streams within unit and one along the west unit boundary - maintain stream channel stability.

Two Class IV streams in unit.

Two Class II streams along southern unit boundary.

Wildlife - maintain wildlife corridors.

South winds predominate - incorporate disturbance ecology principles.

### II. IMPLEMENTATION ACTIVITIES

#### A. ECOSYSTEMS MANAGEMENT:

##### 1. Vegetation:

Stand has no apparent cohort with area of cedar dieback.

##### 2. Aquatic Habitat:

Class I/II: No commercial harvest within 100 feet. No programmed commercial harvest within the RMA. Manage an appropriate distance beyond the no harvest zone to provide windfirmness. (BMP 12.6 Riparian Area Designation and Protection; BMP 13.16 Stream Channel Protection) Both Class II streams to the south are in the Moderate Gradient/Mixed Control Process Group. Manage the area 120 feet beyond the no-cut buffer for windfirmness. Since south winds predominate, the buffer along the unit boundary should be windfirm.

Class III: No programmed commercial timber harvest within the V-notch (side-slope break). Manage an appropriate distance beyond the slope break for windfirmness. (BMP 12.6 Riparian Area Designation and Protection; BMP 13.16 Stream Channel Protection) The three Class III streams are in the High Gradient Contained Process Group. Manage the area 120 feet beyond the V-notch for windfirmness, paying special attention to the southeast aspect.

Class IV: Leave wind resistant buffer consisting of trees less than 16 inches dbh within 20' of the Class IV stream. Splitline on the stream. (BMP 13.16 Stream Channel Protection)

##### 3. Wildlife Habitat:

Unit is in high deer HSI value and high Marten HIS value. South facing slope below 800 feet in elevation. Reserve trees will be retained in all alternatives that prescribe even-aged management.

##### 4. Visuals:

Unit is within the Rowan Peak viewshed and is part of a long range multi-entry harvest scheme designed to work with natural features found in the landscape.

Unit meets modification VQO as designed.

#### B. TRANSPORTATION SYSTEM:

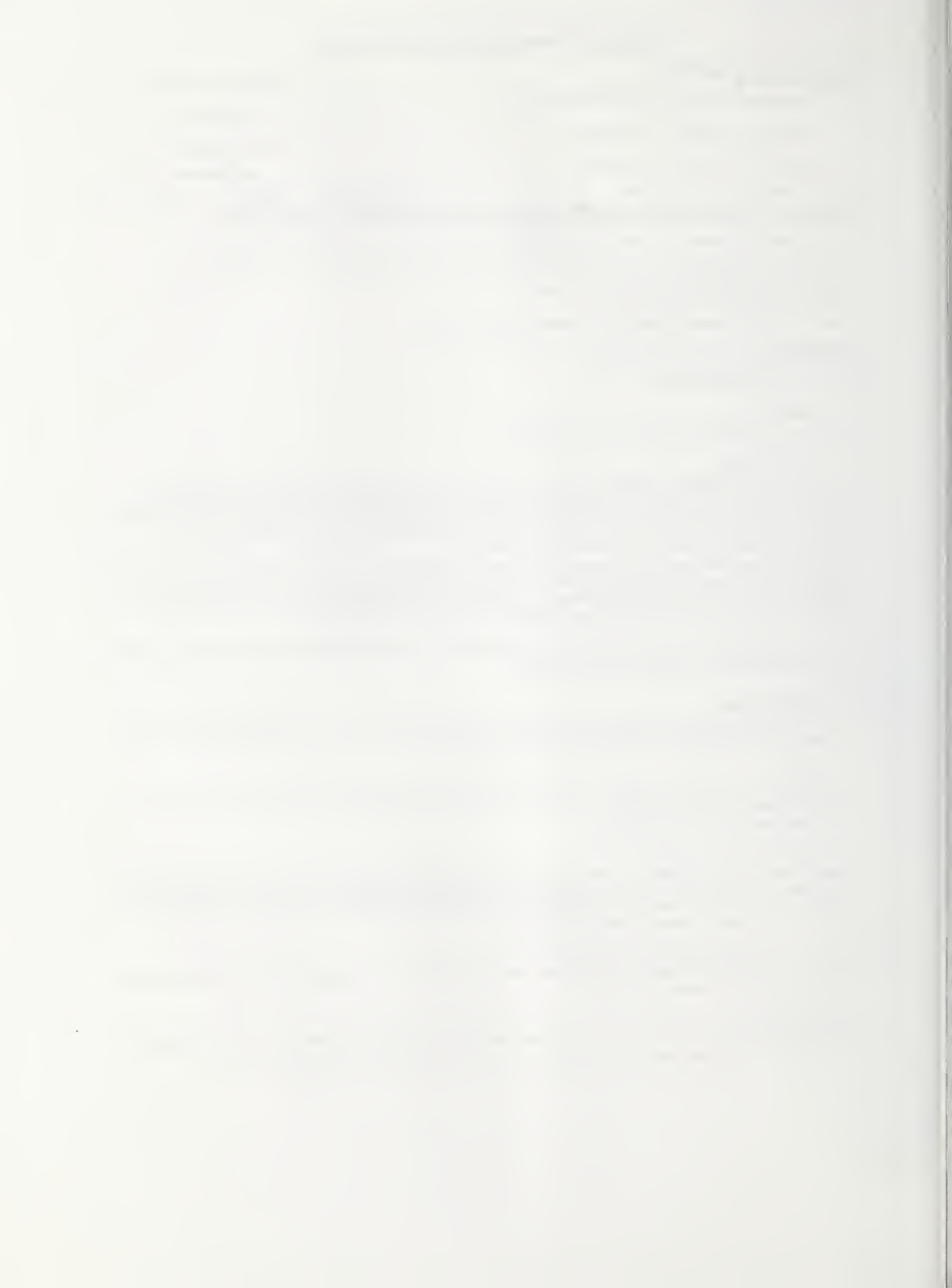
Specified road 46041 runs along the bottom of the unit. A temporary spur crossing a low gradient class II stream is planned to access the eastern setting. A 36" cmp which will allow fish passage is planned for this crossing. All drainage structures will be removed from the temporary spur to restore natural drainage patterns. Additional waterbars will be added as needed, and all areas of exposed soil will be grass seeded.

#### C. SILVICULTURAL PRESCRIPTION SUMMARY:

Evenage Clearcut with 15% retention of large wildlife legacy trees using cable yarding system, certify natural regeneration, pre-commercial thin to maintain healthy stand.

#### D. UNIT DESIGN:

South side of the Class II buffer is undisturbed, so should retain natural windfirmness. There is some risk from east winds. The backline is intentionally irregular and undulating, so as not to appear blocky and harsh on the landscape.



## CRANE and ROWAN MOUNTAIN UNIT PLAN

**VCU-UNIT.ALT** 402-25.3

Management Prescription: Timber Production

Natural Stand Condition: Old Growth

Desired Future Condition Even-aged

Acres Even Aged: 22

Acres 2-Aged: 0

Acres Uneven Aged 0

Volume(MBF) 739.2

USGS 1/4 QUAD MAP #: PTA C1 NW

Aerial Photo: 77

Flight# 4

Photo#

43

### I. RESOURCE CONCERNS/OPPORTUNITIES - UNIT MANAGEMENT OBJECTIVES

Unit is seen from Rowan Bay - meet VQO of Modification.

Two Class III streams within unit and one along the west unit boundary - maintain stream channel stability.

Two Class IV streams in unit.

Two Class II streams along southern unit boundary.

Wildlife - maintain wildlife corridors.

South winds predominate - incorporate disturbance ecology principles.

### II. IMPLEMENTATION ACTIVITIES

#### A. ECOSYSTEMS MANAGEMENT:

##### 1. Vegetation:

Stand has no apparent cohort with area of cedar dieback.

##### 2. Aquatic Habitat:

Class I/II: No commercial harvest within 100 feet. No programmed commercial harvest within the RMA. Manage an appropriate distance beyond the no harvest zone to provide windfirmness. (BMP 12.6 Riparian Area Designation and Protection; BMP 13.16 Stream Channel Protection) Both Class II streams to the south are in the Moderate Gradient/Mixed Control Process Group. Manage the area 120 feet beyond the no-cut buffer for windfirmness. Since south winds predominate, the buffer along the unit boundary should be windfirm.

Class III: No programmed commercial timber harvest within the V-notch (side-slope break). Manage an appropriate distance beyond the slope break for windfirmness. (BMP 12.6 Riparian Area Designation and Protection; BMP 13.16 Stream Channel Protection) The three Class III streams are in the High Gradient Contained Process Group. Manage the area 120 feet beyond the V-notch for windfirmness, paying special attention to the southeast aspect.

Class IV: Leave wind resistant buffer consisting of trees less than 16 inches dbh within 20' of the Class IV stream. Splitline on the stream. (BMP 13.16 Stream Channel Protection)

##### 3. Wildlife Habitat:

Unit is in high deer HSI value and high Marten HIS value. South facing slope below 800 feet in elevation. Reserve trees will be retained in all alternatives that prescribe even-aged management.

##### 4. Visuals:

Unit is within the Rowan Peak viewshed and is part of a long range multi-entry harvest scheme designed to work with natural features found in the landscape. Unit meets modification VQO as designed.

#### B. TRANSPORTATION SYSTEM:

Specified road 46041 runs along the bottom of the unit. A temporary spur crossing a low gradient class II stream is planned to access the eastern setting. A 36" cmp which will allow fish passage is planned for this crossing. All drainage structures will be removed from the temporary spur to restore natural drainage patterns. Additional waterbars will be added as needed, and all areas of exposed soil will be grass seeded.

#### C. SILVICULTURAL PRESCRIPTION SUMMARY:

Evenage Clearcut with 15% retention of large wildlife legacy trees using cable yarding system, certify natural regeneration, pre-commercial thin to maintain healthy stand.

#### D. UNIT DESIGN:

South side of the Class II buffer is undisturbed, so should retain natural windfirmness. There is some risk from east winds. The backline is intentionally irregular and undulating, so as not to appear blocky and harsh on the landscape.





## CRANE and ROWAN MOUNTAIN UNIT PLAN

**VCU-UNIT.ALT** 402-25.4

Management Prescription: Timber Production

Natural Stand Condition: Old Growth

Desired Future Condition

Acres Even Aged: 0

Acres 2-Aged: 0

Acres Uneven Aged 0

Volume(MBF) 0

USGS 1/4 QUAD MAP #: PTA C1 NW

Aerial Photo: 77

Flight# 4

Photo#

43

### I. RESOURCE CONCERNS/OPPORTUNITIES - UNIT MANAGEMENT OBJECTIVES

Unit not in this alternative.

### II. IMPLEMENTATION ACTIVITIES

#### A. ECOSYSTEMS MANAGEMENT:

1. Vegetation:
2. Aquatic Habitat:

3. Wildlife Habitat:

4. Visuals:

#### B. TRANSPORTATION SYSTEM:

#### C. SILVICULTURAL PRESCRIPTION SUMMARY:

#### D. UNIT DESIGN:





CRANE and ROWAN MOUNTAIN UNIT PLAN

VCU-UNIT.ALT 402-25.5

Management Prescription: Timber Production

Natural Stand Condition: Old Growth

Desired Future Condition Even aged

Acres Even Aged: 22

Acres 2-Aged: 0

Acres Uneven Aged 0

Volume(MBF) 739.2

USGS 1/4 QUAD MAP #: PTA C1 NW

Aerial Photo: 77 Flight# 4 Photo# 43

I. RESOURCE CONCERNS/OPPORTUNITIES - UNIT MANAGEMENT OBJECTIVES

Unit is seen from Rowan Bay - meet VQO of Modification.

Two Class III streams within unit and one along the west unit boundary - maintain stream channel stability.

Two Class IV streams in unit.

Two Class II streams along southern unit boundary.

Wildlife - maintain wildlife corridors.

South winds predominate - incorporate disturbance ecology principles.

II. IMPLEMENTATION ACTIVITIES

A. ECOSYSTEMS MANAGEMENT:

1. Vegetation:

Sland has no apparent cohort with area of cedar dieback.

2. Aquatic Habitat:

Class I/II: No commercial harvest within 100 feet. No programmed commercial harvest within the RMA. Manage an appropriate distance beyond the the no harvest zone to provide windfirmness. (BMP 12.6 Riparian Area Designation and Protection; BMP 13.16 Stream Channel Protection) Both Class II streams to the south are in the Moderate Gradient/Mixed Control Process Group. Manage the area 120 feet beyond the no-cut buffer for windfirmness. Since south winds predominate, the buffer along the unit boundary should be windfirm.

Class III: No programmed commercial timber harvest within the V-notch (side-slope break). Manage an appropriate distance beyond the slope break for windfirmness. (BMP 12.6 Riparian Area Designation and Protection; BMP 13.16 Stream Channel Protection) The three Class III streams are in the High Gradient Contained Process Group. Manage the area 120 feet beyond the V-notch for windfirmness, paying special attention to the southeast aspect.

Class IV: Leave wind resistant buffer consisting of trees less than 16 inches dbh within 20' of the Class IV stream. Splitline on the stream. (BMP 13.16 Stream Channel Protection)

3. Wildlife Habitat:

Unit is in high deer HSI value and high Marten HIS value. South facing slope below 800 feet in elevation. Reserve trees will be retained in all alternatives that prescribe even-aged management.

4. Visuals:

Unit is within the Rowan Peak viewshed and is part of a long range multi-entry harvest scheme designed to work with natural features found in the landscape. Unit meets modification VQO as designed.

B. TRANSPORTATION SYSTEM:

Specified road 46041 runs along the bottom of the unit. A temporary spur crossing a low gradient class II stream is planned to access the eastern setting. A 36" cmp which will allow fish passage is planned for this crossing. All drainage structures will be removed from the temporary spur to restore natural drainage patterns. Additional waterbars will be added as needed, and all areas of exposed soil will be grass seeded.

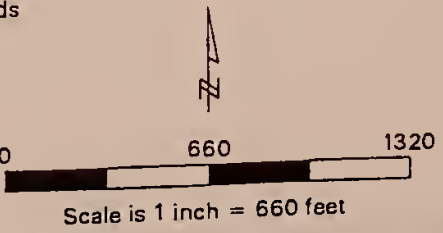
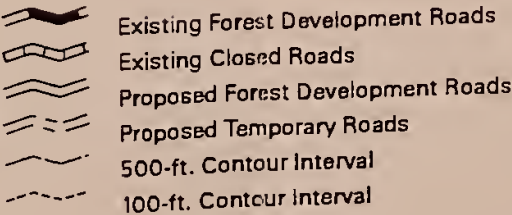
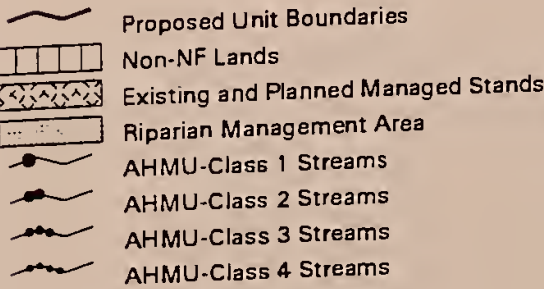
C. SILVICULTURAL PRESCRIPTION SUMMARY:

Evenage Clearcut with 15% retention of large wildlife legacy trees using cable yarding system, certify natural regeneration, pre-commercial thin to maintain healthy stand.

D. UNIT DESIGN:

South side of the Class II buffer is undisturbed, so should retain natural windfirmness. There is some risk from east winds. The backline is intentionally irregular and undulating, so as not to appear blocky and harsh on the landscape.

Crane/Rowan Timber Harvest Unit 402-25







## CRANE and ROWAN MOUNTAIN UNIT PLAN

**VCU-UNIT.ALT** 402-26.2

Management Prescription: Timber Production

Acres Even Aged: 25

Natural Stand Condition: Stem Exclusion/Understory Reinitiation

Acres 2-Aged: 0

Desired Future Condition Even aged

Acres Uneven Aged 0

Volume(MBF) 840

USGS 1/4 QUAD MAP #: PTA C1 NW

Aerial Photo: 77

Flight# 3A

Photo#

7

### I. RESOURCE CONCERNS/OPPORTUNITIES - UNIT MANAGEMENT OBJECTIVES

Unit is seen from Rowan Bay - meet VQO of Modification.

Wildlife - maintain wildlife habitat.

Class III stream along west unit boundary.

Three Class IV streams in unit - maintain stream channel stability.

South winds predominate - incorporate disturbance ecology principles.

Moderately unstable soils in upper portion of unit - maintain soil stability.

### II. IMPLEMENTATION ACTIVITIES

#### A. ECOSYSTEMS MANAGEMENT:

##### 1. Vegetation:

West side is 100 year stem exclusion. East side is older cohort of understory reinitiation. Entire stand has heavy mistletoe, and severe fluting. Occasional large Cedar.

##### 2. Aquatic Habitat:

Class III: No programmed commercial timber harvest within the V-notch (side-slope break). Manage an appropriate distance beyond the slope break for windfirmness. (BMP 12.6 Riparian Area Designation and Protection; BMP 13.16 Stream Channel Protection) The stream along the west boundary is in the High Gradient Contained Process Group. Manage the area 120 feet beyond the V-notch for windfirmness, paying special attention to the southeast aspect.

Class IV: Provide adequate deflection to minimize soil disturbance by using tailtrees on ridge adjacent to the stream. Partially suspend logs over the stream. (BMP 13.16 Stream Channel Protection) Class IV in center of unit will be split on. Leave wind resistant buffer consisting of trees less than 16 inches dbh within 20' of the Class IV stream.

##### 3. Wildlife Habitat:

Unit is in high deer HSI value and high Marten HIS value. South facing slope below 800 feet in elevation. Reserve trees will be retained in all alternatives that prescribe even-aged management.

##### 4. Visuals:

Unit is within the Rowan Peak viewshed and is part of a long range multi-entry harvest scheme designed to work with natural features found in the landscape.

Unit meets modification VQO as designed.

#### B. TRANSPORTATION SYSTEM:

Specified road 46041 runs through the lower portion of the unit.

#### C. SILVICULTURAL PRESCRIPTION SUMMARY:

(a) is Evenaged Clearcut with 15% retention of large wildlife legacy trees using downhill cable yarding system, certify natural regeneration, pre-commercial thin to maintain healthy stand. (b) is same as (a) with uphill cable yarding.

#### D. UNIT DESIGN:

Partial suspension required, unit designed for running skyline.

Eastern edge is directly adjacent to the slide. Unit has been shaped to be compatible with the form and line of this landslide.

Maintain boundary as shown on map and photo overlay to ensure meeting Modification VQO.

Southwestern boundary is defined by an additional Class III stream.

Eastern boundary is located along a natural opening to avoid windthrow.





## CRANE and ROWAN MOUNTAIN UNIT PLAN

**VCU-UNIT.ALT** 402-26.3

Management Prescription: Timber Production

Acres Even Aged: 17

Natural Stand Condition: Stem Exclusion/Understory Reinitiation

Acres 2-Aged: 8

Desired Future Condition Even aged, 2-aged mixture

Acres Uneven Aged 0

Volume(MBF) 723.2

USGS 1/4 QUAD MAP #: PTA C1 NW

Aerial Photo: 77 Flight# 3A Photo# 7

### I. RESOURCE CONCERNS/OPPORTUNITIES - UNIT MANAGEMENT OBJECTIVES

Unit is seen from Rowan Bay - meet VQO of Modification.

Class III stream along west unit boundary.

Three Class IV streams in unit - maintain stream channel stability.

South winds predominate - incorporate disturbance ecology principles.

Moderately unstable soils in upper portion of unit - maintain soil stability.

Wildlife Habitat - Maintain legacy structure in unit where possible for prey species habitat through alternative silvicultural prescription.

### II. IMPLEMENTATION ACTIVITIES

#### A. ECOSYSTEMS MANAGEMENT:

##### 1. Vegetation:

West side is 100 year stem exclusion. East side is older cohort of understory reinitiation. Entire stand has heavy mistletoe, and severe fluting. Occasional large Cedar.

##### 2. Aquatic Habitat:

Class III: No programmed commercial timber harvest within the V-notch (side-slope break). Manage an appropriate distance beyond the slope break for windfirmness. (BMP 12.6 Riparian Area Designation and Protection; BMP 13.16 Stream Channel Protection) The stream along the west boundary is in the High Gradient Contained Process Group. Manage the area 120 feet beyond the V-notch for windfirmness, paying special attention to the southeast aspect.

Class IV: Provide adequate deflection to minimize soil disturbance by using tailtrees on ridge adjacent to the stream. Partially suspend logs over the stream. (BMP 13.16 Stream Channel Protection) Class IV in center of unit will be split on. Leave wind resistant buffer consisting of trees less than 16 inches dbh within 20' of the Class IV stream.

##### 3. Wildlife Habitat:

Reserve trees will be retained in all alternatives that prescribe even-aged management. Retain multi-cohort stand structure and legacy to provide necessary habitat characteristics for forest dwelling species. Part of the unit will be harvested using alternative silvicultural prescriptions. This should exceed TLMP S&Gs.

##### 4. Visuals:

Unit is within the Rowan Peak viewshed and is part of a long range multi-entry harvest scheme designed to work with natural features found in the landscape.

Unit meets partial retention VQO as designed.

#### B. TRANSPORTATION SYSTEM:

Specified road 46041 runs through the lower portion of the unit.

#### C. SILVICULTURAL PRESCRIPTION SUMMARY:

(a) is Clearcut with 15% retention of large wildlife legacy trees using downhill cable yarding system, certify natural regeneration, pre-commercial thin to maintain healthy stand. (b) is 2-aged Seedtree with reserves (upper and lower diameter limit Rx for hemlock and cedar, paint for reserve 2 large spruce every 10 acres) using uphill running skyline cable yarding system, certify natural regeneration, pre-commercial thin to maintain healthy stand. Initial managed stand will have 3 cohorts; 1) Young trees from regeneration harvest. 2) Small residuals left from lower dia. limit harvest 3) Large residual trees with high wildlife value. Over time, it is expected that a 2-aged stand will develop as large trees are removed through senescence and wind snap or by windthrow

#### D. UNIT DESIGN:

Partial suspension required, unit designed for running skyline.

Eastern edge is directly adjacent to the slide. Unit has been shaped to be compatible with the form and line of this landslide.

Maintain boundary as shown on map and photo overlay to ensure meeting Modification VQO.

Southwestern boundary is defined by an additional Class III stream.

Eastern boundary is located along a natural opening to avoid windthrow.





## CRANE and ROWAN MOUNTAIN UNIT PLAN

**VCU-UNIT.ALT** 402-26.4

Management Prescription: Timber Production

Acres Even Aged: 17

Natural Stand Condition: Stem Exclusion/Understory Reinitiation

Acres 2-Aged: 8

Desired Future Condition Even aged, 2-aged mixture

Acres Uneven Aged 0

Volume(MBF) 723.2

USGS 1/4 QUAD MAP #: PTA C1 NW

Aerial Photo: 77

Flight# 3A

Photo#

7

### I. RESOURCE CONCERNS/OPPORTUNITIES - UNIT MANAGEMENT OBJECTIVES

Unit is seen from Rowan Bay - meet VQO of Modification.

Class III stream along west unit boundary.

Three Class IV streams in unit - maintain stream channel stability.

South winds predominate - incorporate disturbance ecology principles

Moderately unstable soils in upper portion of unit - maintain soil stability.

Wildlife Habitat - Maintain legacy structure in unit where possible for prey species habitat through alternative silvicultural prescription.

### II. IMPLEMENTATION ACTIVITIES

#### A. ECOSYSTEMS MANAGEMENT:

##### 1. Vegetation:

West side is 100 year stem exclusion. East side is older cohort of understory reinitiation. Entire stand has heavy mistletoe, and severe fluting. Occasional large Cedar.

##### 2. Aquatic Habitat:

Class III: No programmed commercial timber harvest within the V-notch (side-slope break). Manage an appropriate distance beyond the slope break for windfirmness. (BMP 12.6 Riparian Area Designation and Protection; BMP 13.16 Stream Channel Protection) The stream along the west boundary is in the High Gradient Contained Process Group. Manage the area 120 feet beyond the V-notch for windfirmness, paying special attention to the southeast aspect.

Class IV: Provide adequate deflection to minimize soil disturbance by using tailtrees on ridge adjacent to the stream. Partially suspend logs over the stream. (BMP 13.16 Stream Channel Protection) Class IV in center of unit will be split on. Leave wind resistant buffer consisting of trees less than 16 inches dbh within 20' of the Class IV stream.

##### 3. Wildlife Habitat:

Reserve trees will be retained in all alternatives that prescribe even-aged management. Retain multi-cohort stand structure and legacy to provide necessary habitat characteristics for forest dwelling species. Part of the unit will be harvested using alternative silvicultural prescriptions. This should exceed TLMP S&Gs.

##### 4. Visuals:

Unit is within the Rowan Peak viewshed and is part of a long range multi-entry harvest scheme designed to work with natural features found in the landscape.

Unit meets partial retention VQO as designed.

#### B. TRANSPORTATION SYSTEM:

Specified road 46041 runs through the lower portion of the unit.

#### C. SILVICULTURAL PRESCRIPTION SUMMARY:

(a) is Clearcut with 15% retention of large wildlife legacy trees using downhill cable yarding system, certify natural regeneration, pre-commercial thin to maintain healthy stand. (b) is 2-aged Seedtree with reserves (upper and lower diameter limit Rx for hemlock and cedar, paint for reserve 2 large spruce every 10 acres) using uphill running skyline cable yarding system, certify natural regeneration, pre-commercial thin to maintain healthy stand. Initial managed stand will have 3 cohorts; 1) Young trees from regeneration harvest. 2) Small residuals left from lower dia. limit harvest 3) Large residual trees with high wildlife value. Over time, it is expected that a 2-aged stand will develop as large trees are removed through senescence and wind snap or by windthrow

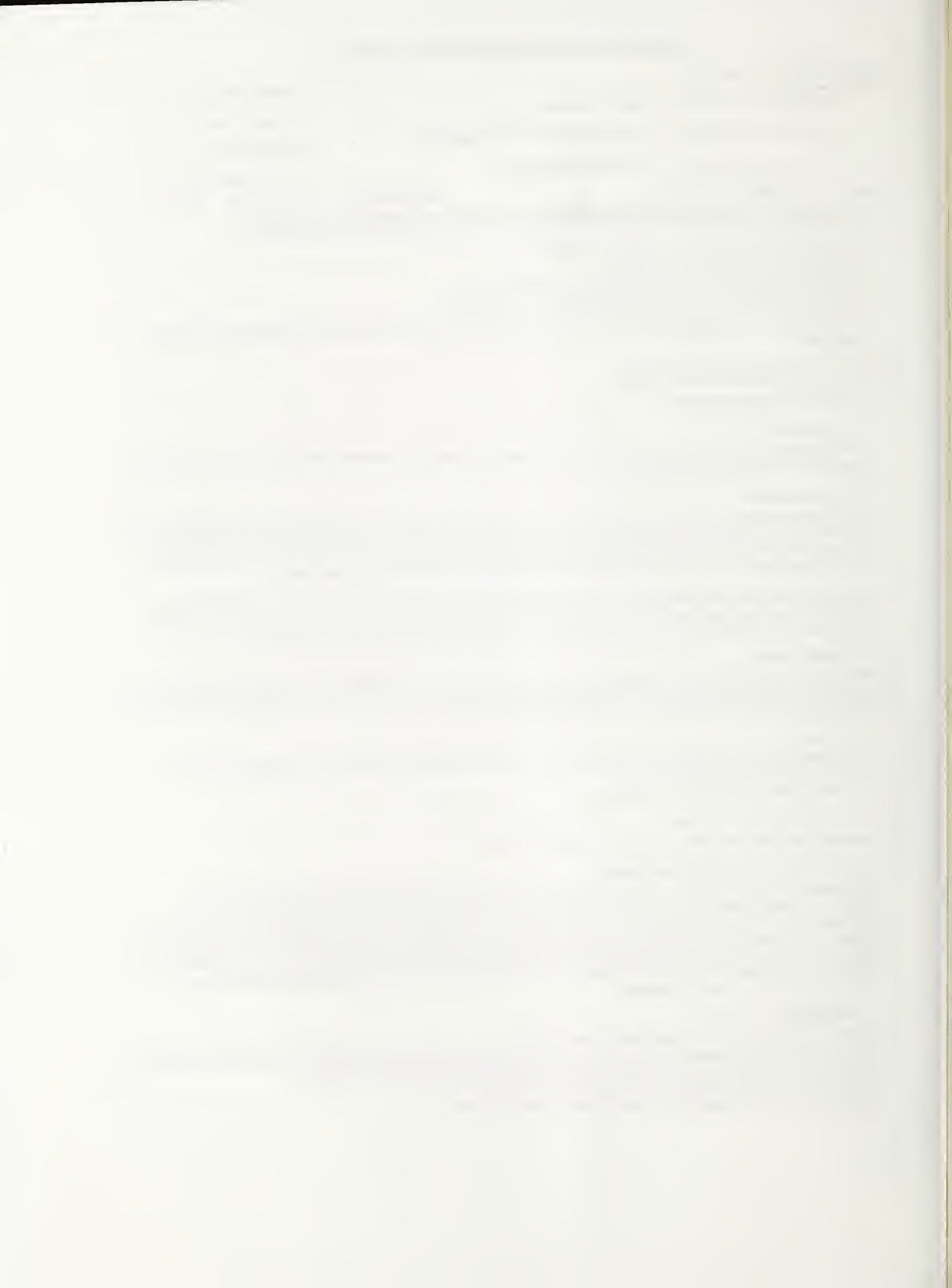
#### D. UNIT DESIGN:

Partial suspension required, unit designed for running skyline.

Eastern edge is directly adjacent to the slide. Unit has been shaped to be compatible with the form and line of this landslide. Maintain boundary as shown on map and photo overlay to ensure meeting Modification VQO.

Southwestern boundary is defined by an additional Class III stream.

Eastern boundary is located along a natural opening to avoid windthrow.





CRANE and ROWAN MOUNTAIN UNIT PLAN

**VCU-UNIT.ALT** 402-26.5

Management Prescription: Timber Production

Natural Stand Condition: Stem Exclusion/Understory Reinitiation

Desired Future Condition Even aged

Acres Even Aged: 25

Acres 2-Aged: 0

Acres Uneven Aged 0

Volume(MBF) 840

USGS 1/4 QUAD MAP #: PTA C1 NW

Aerial Photo: 77

Flight# 3A

Photo#

7

**I. RESOURCE CONCERNS/OPPORTUNITIES - UNIT MANAGEMENT OBJECTIVES**

Unit is seen from Rowan Bay - meet VQO of Modification.

Class III stream along west unit boundary.

Three Class IV streams in unit - maintain stream channel stability.

South winds predominate - incorporate disturbance ecology principles.

Moderately unstable soils in upper portion of unit - maintain soil stability.

**II. IMPLEMENTATION ACTIVITIES**

**A. ECOSYSTEMS MANAGEMENT:**

**1. Vegetation:**

West side is 100 year stem exclusion. East side is older cohort of understory reinitiation. Entire stand has heavy mistletoe, and severe fluting. Occasional large Cedar.

**2. Aquatic Habitat:**

Class III: No programmed commercial timber harvest within the V-notch (side-slope break). Manage an appropriate distance beyond the slope break for windfirmness. (BMP 12.6 Riparian Area Designation and Protection;BMP 13.16 Stream Channel Protection) The stream along the west boundary is in the High Gradient Contained Process Group. Manage the area 120 feet beyond the V-notch for windfirmness, paying special attention to the southeast aspect.

Class IV: Provide adequate deflection to minimize soil disturbance by using tailtrees on ridge adjacent to the stream.

Partially suspend logs over the stream.( BMP13.16 Stream Channel Protection) Class IV in center of unit will be split on.

Leave wind resistant buffer consisting of trees less than 16 inches dbh within 20' of the Class IV stream.

**3. Wildlife Habitat:**

Unit is in high deer HSI value and high Marten HIS value. South facing slope below 800 feet in elevation. Reserve trees will be retained in all alternatives that prescribe even-aged management.

**4. Visuals:**

Unit is within the Rowan Peak viewshed and is part of a long range multi-entry harvest scheme designed to work with natural features found in the landscape.

Unit meets modification VQO as designed.

**B. TRANSPDRTATION SYSTEM:**

Specified road 46041 runs through the lower portion of the unit.

**C. SILVICULTURAL PRESCRIPTION SUMMARY:**

(a) is Evenaged Clearcut with 15% retention of large wildlife legacy trees using downhill cable yarding system, certify natural regeneration, pre-commercial thin to maintain healthy stand. (b) is same as (a) with uphill cable yarding.

**D. UNIT DESIGN:**

Partial suspension required, unit designed for running skyline.

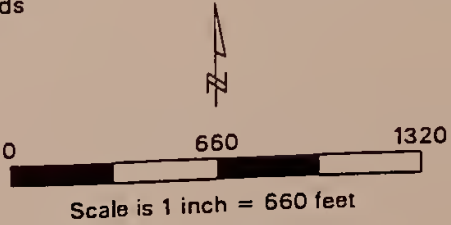
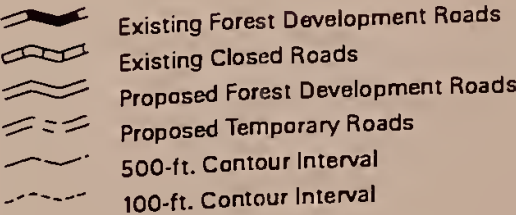
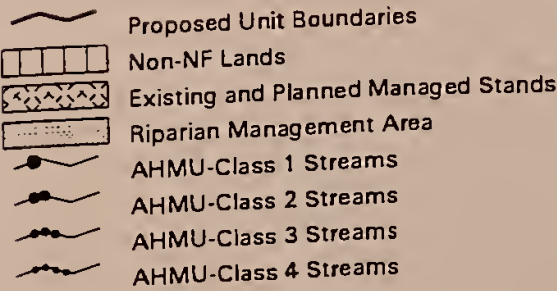
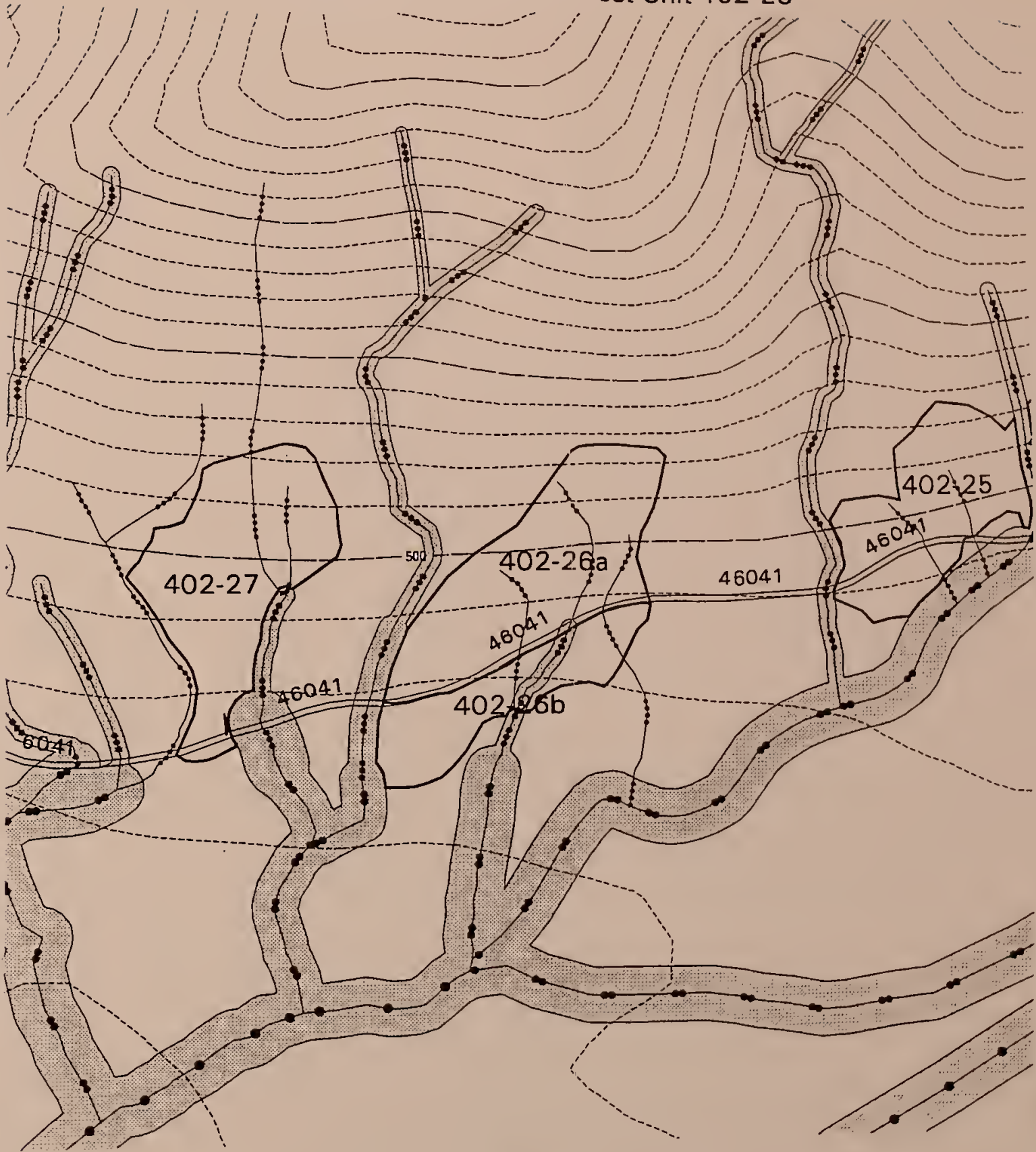
Eastem edge is directly adjacent to the slide. Unit has been shaped to be compatible with the form and line of this landslide.

Mainlain boundary as shown on map and photo overlay to ensure meeting Modification VQO.

Southwestern boundary is defined by an additional Class III stream.

Eastern boundary is located along a natural opening to avoid windthrow.

Crane/Rowan Timber Harvest Unit 402-26







## CRANE and ROWAN MOUNTAIN UNIT PLAN

**VCU-UNIT.ALT** 402-27.2

Management Prescription: Timber Production

Acres Even Aged: 16

Natural Stand Condition: Understory Reinitiation

Acres 2-Aged: 0

Desired Future Condition Even aged

Acres Uneven Aged 0

Volume(MBF) 537.6

USGS 1/4 QUAD MAP #: PTA C1 NW

Aerial Photo: 77

Flight# 3a Photo#

7

### I. RESOURCE CONCERNS/OPPORTUNITIES - UNIT MANAGEMENT OBJECTIVES

Unit in deer winter range - protect habitat.  
Unit is visible from Rowan Bay - meet VQO of Modification.  
Class III stream along eastern boundary - maintain stream channel stability.  
Two Class IV streams in unit and one along western boundary.  
South winds predominate - incorporate disturbance ecology principles.

### II. IMPLEMENTATION ACTIVITIES

#### A. ECOSYSTEMS MANAGEMENT:

##### 1. Vegetation:

Early Understory Reinitiation, dense stand of even aged almost pure spruce of landslide origin (120 years). Small patch of Old Growth on east side with good Cedar.

##### 2. Aquatic Habitat:

Class III: No programmed commercial timber harvest within the V-notch (side-slope break). Manage an appropriate distance beyond the slope break for windfirmness. (BMP 12.6 Riparian Area Designation and Protection; BMP 13.16 Stream Channel Protection) The Class III stream to the southeast is in the High Gradient Contained Process Group. Manage the area 120 feet from the V-notch to provide for windfirmness. Since South winds predominate, the no-cut buffer is expected to be windfirm.

Class IV: Provide adequate deflection to minimize soil disturbance by using tailtrees on ridge adjacent to the stream. Partially suspend logs over the stream. (BMP 13.16 Stream Channel Protection) Leave a wind resistant buffer consisting of trees less than 16 inches dbh within 20' of the Class IV stream along the west boundary.

##### 3. Wildlife Habitat:

Unit is in high deer HSI value and high Marten HIS value. South facing slope below 800 feet in elevation. Reserve trees will be retained in all alternatives that prescribe even-aged management.

##### 4. Visuals:

Unit is within the Rowan Peak viewshed and is part of a long range multi-entry harvest scheme designed to work with natural features found in the landscape. Unit meets modification VQO as designed.

#### B. TRANSPORTATION SYSTEM:

Specified road 46041 runs through the lower portion of the unit. A temporary spur is planned to access a landing on a bench further upslope in the unit. All drainage structures will be removed from the temporary spur to restore natural drainage patterns. Additional waterbars will be added as needed, and all areas of exposed soil will be grass seeded.

#### C. SILVICULTURAL PRESCRIPTION SUMMARY:

Evenage Clearcut with 15% retention of large wildlife legacy trees using cable yarding system, certify natural regeneration, pre-commercial thin to maintain healthy stand.

#### D. UNIT DESIGN:

Windthrow has occurred in the past from southeast winds; unit has been oriented parallel to the wind.

Unit is designed to work with planned, adjacent openings using features found in the landscape with the intent to meet the visual objective.





## CRANE and ROWAN MOUNTAIN UNIT PLAN

**VCU-UNIT.ALT** 402-27.3

Management Prescription: Timber Production

Acres Even Aged: 16

Natural Stand Condition: Understory Reinitiation

Acres 2-Aged: 0

Desired Future Condition Even aged, 2-aged mixture

Acres Uneven Aged 0

Volume(MBF) 537.6

USGS 1/4 QUAD MAP #: PTA C1 NW

Aerial Photo: 77

Flight# 3a Photo# 7

### I. RESOURCE CONCERNS/OPPORTUNITIES - UNIT MANAGEMENT OBJECTIVES

Unit in deer winter range - protect habitat.

Unit is visible from Rowan Bay - meet VQO of Modification.

Class III stream along eastern boundary - maintain stream channel stability.

Two Class IV streams in unit and one along western boundary.

South winds predominate - incorporate disturbance ecology principles.

Maintain habitat for important wildlife species through alternative silvicultural prescription.

### II. IMPLEMENTATION ACTIVITIES

#### A. ECOSYSTEMS MANAGEMENT:

##### 1. Vegetation:

Early Understory Reinitiation, dense stand of even aged almost pure spruce of landslide origin (120 years). Small patch of Old Growth on east side with good Cedar.

##### 2. Aquatic Habitat:

Class III: No programmed commercial timber harvest within the V-notch (side-slope break). Manage an appropriate distance beyond the slope break for windfirmness. (BMP 12.6 Riparian Area Designation and Protection; BMP 13.16 Stream Channel Protection) The Class III stream to the southeast is in the High Gradient Contained Process Group. Manage the area 120 feet from the V-notch to provide for windfirmness. Since South winds predominate, the no-cut buffer is expected to be windfirm.

Class IV: Provide adequate deflection to minimize soil disturbance by using tailtrees on ridge adjacent to the stream. Partially suspend logs over the stream. (BMP 13.16 Stream Channel Protection) Leave a wind resistant buffer consisting of trees less than 16 inches dbh within 20' of the Class IV stream along the west boundary.

##### 3. Wildlife Habitat:

Unit is in high deer HSI value and high Marten HIS value. South facing slope below 800 feet in elevation. Reserve trees will be retained in all alternatives that prescribe even-aged management.

##### 4. Visuals:

Unit is within the Rowan Peak viewshed and is part of a long range multi-entry harvest scheme designed to work with natural features found in the landscape. Unit meets partial retention VQO as designed.

#### B. TRANSPORTATION SYSTEM:

Specified road 46041 runs through the lower portion of the unit. A temporary spur is planned to access a landing on a bench further upslope in the unit. All drainage structures will be removed from the temporary spur to restore natural drainage patterns. Additional waterbars will be added as needed, and all areas of exposed soil will be grass seeded.

#### C. SILVICULTURAL PRESCRIPTION SUMMARY:

Evenage Clearcut with 15% retention of large wildlife legacy trees using cable yarding system, certify natural regeneration, pre-commercial thin to maintain healthy stand.

#### D. UNIT DESIGN:

Windthrow has occurred in the past from southeast winds; unit has been oriented parallel to the wind.

Unit is designed to work with planned, adjacent openings using features found in the landscape with the intent to meet the visual objective.



## CRANE and ROWAN MOUNTAIN UNIT PLAN

**VCU-UNIT.ALT** 402-27.4

Management Prescription: Timber Production

Acres Even Aged: 16

Natural Stand Condition: Understory Reinitiation

Acres 2-Aged: 0

Desired Future Condition Even aged

Acres Uneven Aged 0

Volume(MBF) 537.6

USGS 1/4 QUAD MAP #: PTA C1 NW

Aerial Photo: 77

Flight# 3a

Photo#

7

### I. RESOURCE CONCERNS/OPPORTUNITIES - UNIT MANAGEMENT OBJECTIVES

Unit in deer winter range - protect habitat.

Unit is visible from Rowan Bay - meet VQO of Modification.

Class III stream along eastern boundary - maintain stream channel stability.

Two Class IV streams in unit and one along western boundary.

South winds predominate - incorporate disturbance ecology principles.

Unit is visible from Rowan Bay - meet VQO of Modification.

Maintain habitat for important wildlife species through alternative silvicultural prescription.

South winds predominate - maintain windfirmness.

### II. IMPLEMENTATION ACTIVITIES

#### A. ECOSYSTEMS MANAGEMENT:

##### 1. Vegetation:

Early Understory Reinitiation, dense stand of even aged almost pure spruce of landslide origin (120 years). Small patch of Old Growth on east side with good Cedar.

##### 2. Aquatic Habitat:

Class III: No programmed commercial timber harvest within the V-notch (side-slope break). Manage an appropriate distance beyond the slope break for windfirmness. (BMP 12.6 Riparian Area Designation and Protection; BMP 13.16 Stream Channel Protection) The Class III stream to the southeast is in the High Gradient Contained Process Group. Manage the area 120 feet from the V-notch to provide for windfirmness. Since South winds predominate, the no-cut buffer is expected to be windfirm.

Class IV: Provide adequate deflection to minimize soil disturbance by using tailtrees on ridge adjacent to the stream.

Partially suspend logs over the stream. (BMP 13.16 Stream Channel Protection) Leave a wind resistant buffer consisting of trees less than 16 inches dbh within 20' of the Class IV stream along the west boundary.

##### 3. Wildlife Habitat:

Unit is in high deer HSI value and high Marten HIS value. South facing slope below 800 feet in elevation. Reserve trees will be retained in all alternatives that prescribe even-aged management.

##### 4. Visuals:

Unit is within the Rowan Peak viewshed and is part of a long range multi-entry harvest scheme designed to work with natural features found in the landscape. Unit meets partial retention VQO as designed.

#### B. TRANSPORTATION SYSTEM:

Specified road 46041 runs through the lower portion of the unit. A temporary spur is planned to access a landing on a bench further upslope in the unit. All drainage structures will be removed from the temporary spur to restore natural drainage patterns. Additional waterbars will be added as needed, and all areas of exposed soil will be grass seeded.

#### C. SILVICULTURAL PRESCRIPTION SUMMARY:

Evenage Clearcut with 15% retention of large wildlife legacy trees using cable yarding system, certify natural regeneration, pre-commercial thin to maintain healthy stand.

#### D. UNIT DESIGN:

Windthrow has occurred in the past from southeast winds; unit has been oriented parallel to the wind.

Unit is designed to work with planned, adjacent openings using features found in the landscape with the intent to meet the visual objective.





CRANE and ROWAN MOUNTAIN UNIT PLAN

**VCU-UNIT.ALT** 402-27.5

Management Prescription: Timber Production

Natural Stand Condition: Understory Reinitiation

Desired Future Condition Even aged

Acres Even Aged: 16

Acres 2-Aged: 0

Acres Uneven Aged 0

Volume(MBF) 537.6

USGS 1/4 QUAD MAP #: PTA C1 NW

Aerial Photo: 77

Flight# 3a

Photo# 7

**I. RESOURCE CONCERNS/OPPORTUNITIES - UNIT MANAGEMENT OBJECTIVES**

- Unit in deer winter range - protect habitat.
- Unit is visible from Rowan Bay - meet VQO of Modification.
- Class III stream along eastern boundary - maintain stream channel stability.
- Two Class IV streams in unit and one along western boundary.
- South winds predominate - incorporate disturbance ecology principles.

**II. IMPLEMENTATION ACTIVITIES**

**A. ECOSYSTEMS MANAGEMENT:**

**1. Vegetation:**

Early Understory Reinitiation, dense stand of even aged almost pure spruce of landslide origin (120 years). Small patch of Old Growth on east side with good Cedar.

**2. Aquatic Habitat:**

Class III: No programmed commercial timber harvest within the V-notch (side-slope break). Manage an appropriate distance beyond the slope break for windfirmness. (BMP 12.6 Riparian Area Designation and Protection;BMP 13.16 Stream Channel Protection) The Class III stream to the southeast is in the High Gradient Contained Process Group. Manage the area 120 feet from the V-notch to provide for windfirmness. Since South winds predominate, the no-cut buffer is expected to be windfirm.  
Class IV: Provide adequate deflection to minimize soil disturbance by using tailtrees on ridge adjacent to the stream. Partially suspend logs over the stream.( BMP 13.16 Stream Channel Protection) Leave a wind resistant buffer consisting of trees less than 16 inches dbh within 20' of the Class IV stream along the west boundary.

**3. Wildlife Habitat:**

Unit is in high deer HSI value and high Marten HIS value. South facing slope below 800 feet in elevation. Reserve trees will be retained in all alternatives that prescribe even-aged management.

**4. Visuals:**

Unit is within the Rowan Peak viewshed and is part of a long range multi-entry harvest scheme designed to work with natural features found in the landscape. Unit meets modification VQO as designed.

**B. TRANSPORTATION SYSTEM:**

Specified road 46041 runs through the lower portion of the unit. A temporary spur is planned to access a landing on a bench further upslope in the unit. All drainage structures will be removed from the temporary spur to restore natural drainage patterns. Additional waterbars will be added as needed, and all areas of exposed soil will be grass seeded.

**C. SILVICULTURAL PRESCRIPTION SUMMARY:**

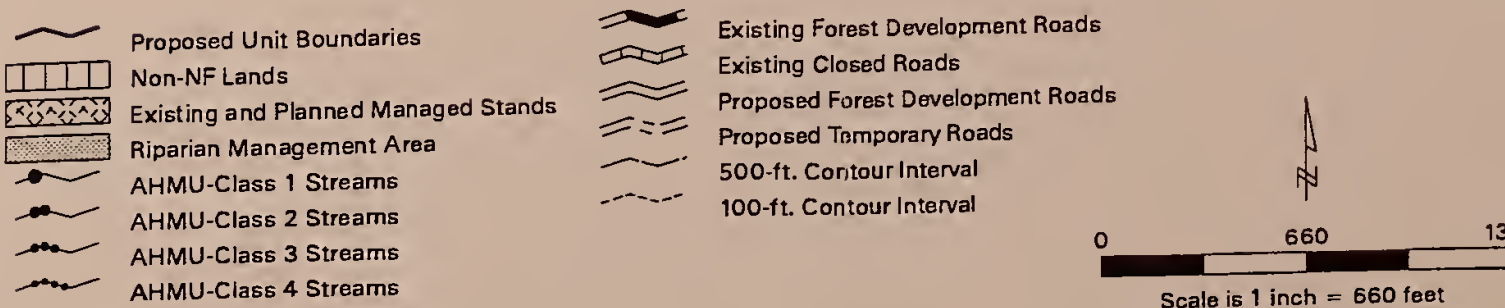
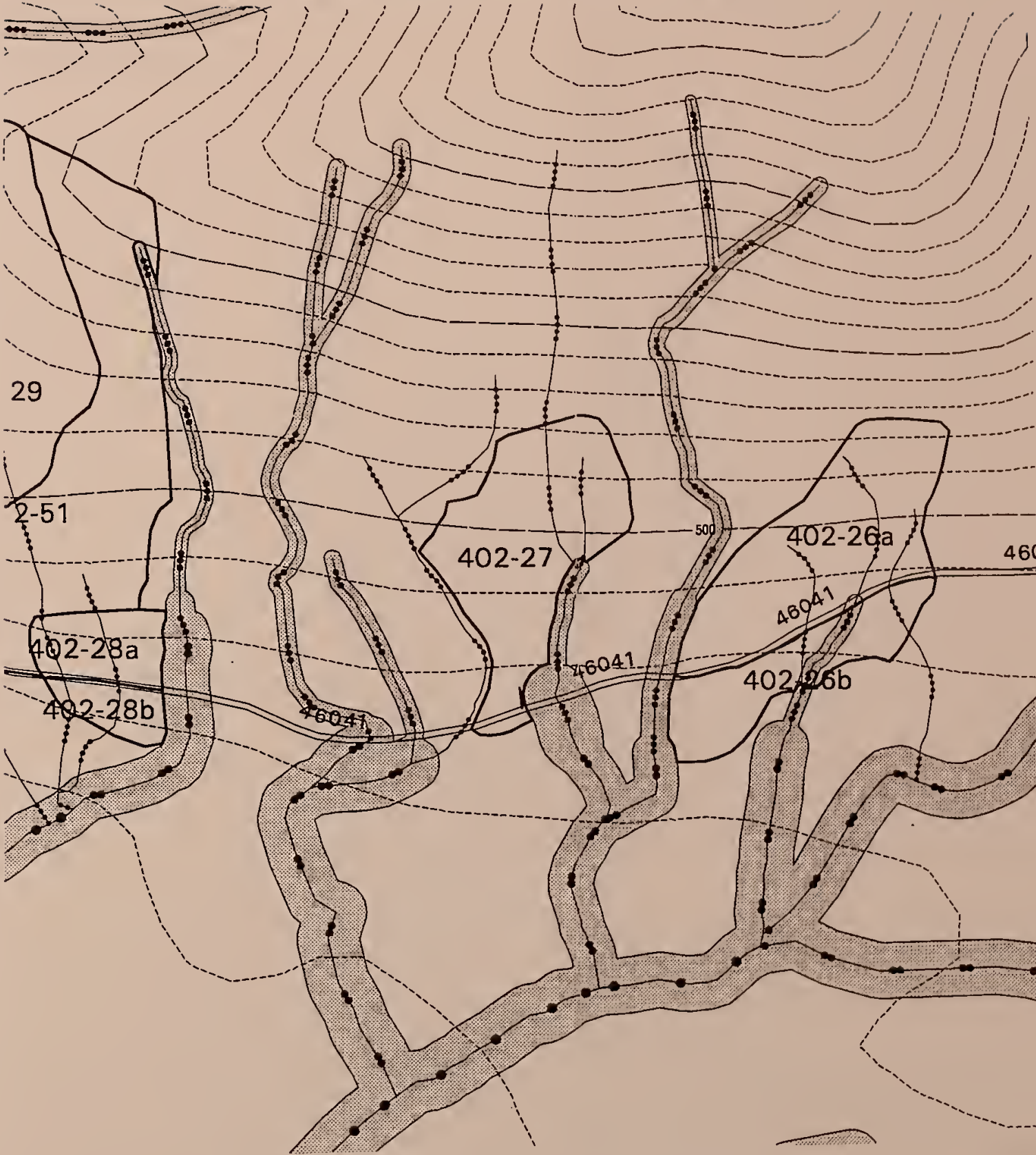
Evenage Clearcut with 15% retention of large wildlife legacy trees using cable yarding system, certify natural regeneration, pre-commercial thin to maintain healthy stand.

**D. UNIT DESIGN:**

Windthrow has occurred in the past from southeast winds; unit has been oriented parallel to the wind.

Unit is designed to work with planned, adjacent openings using features found in the landscape with the intent to meet the visual objective.

Crane/Rowan Timber Harvest Unit 402-27







## CRANE and ROWAN MOUNTAIN UNIT PLAN

**VCU-UNIT.ALT** 402-28.2

Management Prescription: Timber Production

Acres Even Aged: 7

Natural Stand Condition: Old Growth

Acres 2-Aged: 0

Desired Future Condition Even aged

Acres Uneven Aged 0

Volume(MBF) 235.2

USGS 1/4 QUAD MAP #: PTA C1 NW

Aerial Photo: 77 Flight# 3A Photo# 8

### I. RESOURCE CONCERNS/OPPORTUNITIES - UNIT MANAGEMENT OBJECTIVES

Class II stream adjacent to unit - maintain riparian buffer.  
Two Class IV streams in unit.  
Unit is seen from Rowan Bay - meet VQO of Modification.  
Estuary habitat southwest of unit - maintain habitat.  
Southeast winds predominate - incorporate disturbance ecology principles.

### II. IMPLEMENTATION ACTIVITIES

#### A. ECOSYSTEMS MANAGEMENT:

##### 1. Vegetation:

Stand has no apparent cohorts. Is moderately poor drainage.

##### 2. Aquatic Habitat:

Class I/II: No commercial harvest within 100 feet. No programmed commercial harvest within the RMA. Manage an appropriate distance beyond the no harvest zone to provide windfirmness. (BMP 12.6 Riparian Area Designation and Protection; BMP 13.16 Stream Channel Protection) The Class II stream along the east boundary is in the High Gradient Contained Process Group. Manage the area 120 feet beyond the no harvest buffer for windfirmness. Since South winds predominate, the no-cut buffer is expected to be windfirm.

Class III: No programmed commercial timber harvest within the V-notch (side-slope break). Manage an appropriate distance beyond the slope break for windfirmness. (BMP 12.6 Riparian Area Designation and Protection; BMP 13.16 Stream Channel Protection)

Class IV: Provide adequate deflection to minimize soil disturbance by using tailtrees on ridge adjacent to the stream. Partially suspend logs over the stream. (BMP 13.16 Stream Channel Protection)

##### 3. Wildlife Habitat:

Unit is in high deer HSI value and high Marten HIS value. South facing slope below 800 feet in elevation. Reserve trees will be retained in all alternatives that prescribe even-aged management.

##### 4. Visuals:

Unit is within the Rowan Peak viewshed and is part of a long range multi-entry harvest scheme designed to work with natural features found in the landscape. Unit meets partial retention VQO as designed.

#### B. TRANSPORTATION SYSTEM:

Specified road 46041 ends at the east boundary of unit 402-28. A temporary spur is planned to run through this unit and continue on to 402-29. The landing for this unit will also serve helicopter units 402-29 and 402-51. All drainage structures will be removed from the temporary spur to restore natural drainage patterns. Additional waterbars will be added as needed, and all areas of exposed soil will be grass seeded.

#### C. SILVICULTURAL PRESCRIPTION SUMMARY:

(a) is Evenaged Clearcut with 15% retention of large wildlife legacy trees using downhill cable yarding system, certify natural regeneration, pre-commercial thin to maintain healthy stand. (b) is same as (a) with uphill cable yarding.

#### D. UNIT DESIGN:

Use Class II stream on east side as boundary.  
Past windthrow has occurred from southeast winds. Unit has been oriented parallel to these winds.



## CRANE and ROWAN MOUNTAIN UNIT PLAN

**VCU-UNIT.ALT** 402-28.3

Management Prescription: Timber Production

Acres Even Aged: 4

Natural Stand Condition: Old Growth

Acres 2-Aged: 3

Desired Future Condition Even aged, 2-aged mixture

Acres Uneven Aged 0

Volume(MBF) 191.4

USGS 1/4 QUAD MAP #: PTA C1 NW

Aerial Photo: 77

Flight# 3A Photo#

8

### I. RESOURCE CONCERNS/OPPORTUNITIES - UNIT MANAGEMENT OBJECTIVES

Class II stream adjacent to unit - maintain riparian buffer.

Two Class IV streams in unit.

Unit is seen from Rowan Bay - meet VQO of Modification.

Estuary habitat southwest of unit - maintain habitat.

Southeast winds predominate - incorporate disturbance ecology principles.

Wildlife Habitat - Maintain legacy structure in unit where possible for prey species habitat through alternative silvicultural prescription.

### II. IMPLEMENTATION ACTIVITIES

#### A. ECOSYSTEMS MANAGEMENT:

##### 1. Vegetation:

Stand has no apparent cohorts. Is moderately poor drainage.

##### 2. Aquatic Habitat:

Class I/II: No commercial harvest within 100 feet. No programmed commercial harvest within the RMA. Manage an appropriate distance beyond the no harvest zone to provide windfirmness. (BMP 12.6 Riparian Area Designation and Protection; BMP 13.16 Stream Channel Protection) The Class II stream along the east boundary is in the High Gradient Contained Process Group. Manage the area 120 feet beyond the no harvest buffer for windfirmness. Since South winds predominate, the no-cut buffer is expected to be windfirm.

Class III: No programmed commercial timber harvest within the V-notch (side-slope break). Manage an appropriate distance beyond the slope break for windfirmness. (BMP 12.6 Riparian Area Designation and Protection; BMP 13.16 Stream Channel Protection)

Class IV: Provide adequate deflection to minimize soil disturbance by using tailtrees on ridge adjacent to the stream. Partially suspend logs over the stream. (BMP 13.16 Stream Channel Protection)

##### 3. Wildlife Habitat:

Unit is in high deer HSI value and high Marten HIS value. South facing slope below 800 feet in elevation. Reserve trees will be retained in all alternatives that prescribe even-aged management. Retain multi-cohort stand structure and legacy to provide necessary habitat characteristics for forest dwelling species. Part of the unit will be harvested using alternative silvicultural prescriptions. This should exceed TLMP S&Gs.

##### 4. Visuals:

Unit is within the Rowan Peak viewshed and is part of a long range multi-entry harvest scheme designed to work with natural features found in the landscape. Unit meets partial retention VQO as designed.

#### B. TRANSPORTATION SYSTEM:

Specified road 46041 ends at the east boundary of unit 402-28. A temporary spur is planned to run through this unit and continue on to 402-29. The landing for this unit will also serve helicopter units 402-29 and 402-51. All drainage structures will be removed from the temporary spur to restore natural drainage patterns. Additional waterbars will be added as needed, and all areas of exposed soil will be grass seeded.

#### C. SILVICULTURAL PRESCRIPTION SUMMARY:

(a) is Clearcut with 15% retention of large wildlife legacy trees using downhill cable yarding system, certify natural regeneration, pre-commercial thin to maintain healthy stand. (b) is 2-aged Seedtree with reserves (upper and lower diameter limit Rx for hemlock and cedar, paint for reserve 2 large spruce every 10 acres) using uphill running skyline cable yarding system, certify natural regeneration, pre-commercial thin to maintain healthy stand. Initial managed stand will have 3 cohorts; 1) Young trees from regeneration harvest. 2) Small residuals left from lower dia. limit harvest 3) Large residual trees with high wildlife value. Over time, it is expected that a 2-aged stand will develop as large trees are removed through senescence and wind snap or by windthrow

#### D. UNIT DESIGN:

Use Class II stream on east side as boundary.

Past windthrow has occurred from southeast winds. Unit has been oriented parallel to these winds.





## CRANE and ROWAN MOUNTAIN UNIT PLAN

**VCU-UNIT.ALT 402-28.4**

Management Prescription: Timber Production

Acres Even Aged: 4

Natural Stand Condition: Old Growth

Acres 2-Aged: 3

Desired Future Condition Even aged, 2-aged mixture

Acres Uneven Aged 0

Volume(MBF) 191.4

USGS 1/4 QUAD MAP #: PTA C1 NW

Aerial Photo: 77

Flight# 3A

Photo#

8

### I. RESOURCE CONCERNS/OPPORTUNITIES - UNIT MANAGEMENT OBJECTIVES

Class II stream adjacent to unit - maintain riparian buffer.

Two Class IV streams in unit.

Unit is seen from Rowan Bay - meet VQO of Modification.

Estuary habitat southwest of unit - maintain habitat.

Southeast winds predominate - incorporate disturbance ecology principles

Wildlife Habitat - Maintain legacy structure in unit where possible for prey species habitat through alternative silvicultural prescription.

### II. IMPLEMENTATION ACTIVITIES

#### A. ECOSYSTEMS MANAGEMENT:

##### 1. Vegetation:

Stand has no apparent cohorts. Is moderately poor drainage.

##### 2. Aquatic Habitat:

Class I/II: No commercial harvest within 100 feet. No programmed commercial harvest within the RMA. Manage an appropriate distance beyond the no harvest zone to provide windfirmness. (BMP 12.6 Riparian Area Designation and Protection; BMP 13.16 Stream Channel Protection) The Class II stream along the east boundary is in the High Gradient Contained Process Group. Manage the area 120 feet beyond the no harvest buffer for windfirmness. Since South winds predominate, the no-cut buffer is expected to be windfirm.

Class III: No programmed commercial timber harvest within the V-notch (side-slope break). Manage an appropriate distance beyond the slope break for windfirmness. (BMP 12.6 Riparian Area Designation and Protection; BMP 13.16 Stream Channel Protection)

Class IV: Provide adequate deflection to minimize soil disturbance by using tailtrees on ridge adjacent to the stream. Partially suspend logs over the stream. (BMP 13.16 Stream Channel Protection)

##### 3. Wildlife Habitat:

Unit is in high deer HSI value and high Marten HIS value. South facing slope below 800 feet in elevation. Reserve trees will be retained in all alternatives that prescribe even-aged management. Retain multi-cohort stand structure and legacy to provide necessary habitat characteristics for forest dwelling species. Part of the unit will be harvested using alternative silvicultural prescriptions. This should exceed TLMP S&Gs.

##### 4. Visuals:

Unit is within the Rowan Peak viewshed and is part of a long range multi-entry harvest scheme designed to work with natural features found in the landscape. Unit meets partial retention VQO as designed.

#### B. TRANSPORTATION SYSTEM:

Specified road 46041 ends at the east boundary of unit 402-28. A temporary spur is planned to run through this unit and continue on to 402-29. The landing for this unit will also serve helicopter units 402-29 and 402-51. All drainage structures will be removed from the temporary spur to restore natural drainage patterns. Additional waterbars will be added as needed, and all areas of exposed soil will be grass seeded.

#### C. SILVICULTURAL PRESCRIPTION SUMMARY:

(a) is Clearcut with 15% retention of large wildlife legacy trees using downhill cable yarding system, certify natural regeneration, pre-commercial thin to maintain healthy stand. (b) is 2-aged Seedtree with reserves (upper and lower diameter limit Rx for hemlock and cedar, paint for reserve 2 large spruce every 10 acres) using uphill running skyline cable yarding system, certify natural regeneration, pre-commercial thin to maintain healthy stand. Initial managed stand will have 3 cohorts; 1) Young trees from regeneration harvest. 2) Small residuals left from lower dia. limit harvest 3) Large residual trees with high wildlife value. Over time, it is expected that a 2-aged stand will develop as large trees are removed through senescence and wind snap or by windthrow

#### D. UNIT DESIGN:

Use Class II stream on east side as boundary.

Past windthrow has occurred from southeast winds. Unit has been oriented parallel to these winds.





CRANE and ROWAN MOUNTAIN UNIT PLAN

**VCU-UNIT.ALT 402-28.5**

Management Prescription: Timber Production

Natural Stand Condition: Old Growth

Desired Future Condition: Even aged

Acres Even Aged: 7

Acres 2-Aged: 0

Acres Uneven Aged: 0

Volume(MBF): 235.2

USGS 1/4 QUAD MAP #: PTA C1 NW

Aerial Photo: 77 Flight# 3A Photo# 8

**RESOURCE CONCERNS/OPPORTUNITIES - UNIT MANAGEMENT OBJECTIVES**

- Class II stream adjacent to unit - maintain riparian buffer.
- Two Class IV streams in unit.
- Unit is seen from Rowan Bay - meet VQO of Modification.
- Estuary habitat southwest of unit - maintain habitat.
- Southeast winds predominate -incorporate disturbance ecology principles

**IMPLEMENTATION ACTIVITIES**

**A. ECOSYSTEMS MANAGEMENT:**

**1. Vegetation:**

Stand has no apparent cohorts. Is moderately poor drainage.

**2. Aquatic Habitat:**

Class I/II: No commercial harvest within 100 feet. No programmed commercial harvest within the RMA. Manage an appropriate distance beyond the the no harvest zone to provide windfirmness. (BMP 12.6 Riparian Area Designation and Protection; BMP 13.16 Stream Channel Protection) The Class II stream along the east boundary is in the High Gradient Contained Process Group. Manage the area 120 feet beyond the no harvest buffer for windfirmness. Since South winds predominate, the no-cut buffer is expected to be windfirm.

Class III: No programmed commercial timber harvest within the V-notch (side-slope break). Manage an appropriate distance beyond the slope break for windfirmness. (BMP 12.6 Riparian Area Designation and Protection)

Class IV: Provide adequate deflection to minimize soil disturbance by using tailtrees on ridge adjacent to the stream. Partially suspend logs over the stream.( BMP13.16 Stream Channel Protection)

**3. Wildlife Habitat:**

Unit is in high deer HSI value and high Marten HIS value. South facing slope below 800 feet in elevation. Reserve trees will be retained in all alternatives that prescribe even-aged management.

**4. Visuals:**

Unit is within the Rowan Peak viewshed and is part of a long range multi-entry harvest scheme designed to work with natural features found in the landscape. Unit meets partial retention VQO as designed.

**B. TRANSPORTATION SYSTEM:**

Specified road 46041 ends at the east boundary of unit 402-28. A temporary spur is planned to run through this unit and continue on to 402-29. The landing for this unit will also serve helicopter units 402-29 and 402-51. All drainage structures will be removed from the temporary spur to restore natural drainage patterns. Additional waterbars will be added as needed, and all areas of exposed soil will be grass seeded.

**C. SILVICULTURAL PRESCRIPTION SUMMARY:**

(a) is Evenaged Clearcut with 15% retention of large wildlife legacy trees using downhill cable yarding system, certify natural regeneration, pre-commercial thin to maintain healthy stand. (b) is same as (a) with uphill cable yarding.

**D. UNIT DESIGN:**

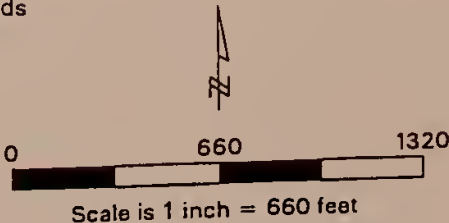
Use Class II stream on east side as boundary.  
Past wind throw has occurred from southeast winds. Unit has been oriented parallel to these winds.

Crane/Rowan Timber Harvest Unit 402-28



- Proposed Unit Boundaries
- Non-NF Lands
- Existing and Planned Managed Stands
- Riparian Management Area
- AHMU-Class 1 Streams
- AHMU-Class 2 Streams
- AHMU-Class 3 Streams
- AHMU-Class 4 Streams

- Existing Forest Development Roads
- Existing Closed Roads
- Proposed Forest Development Roads
- Proposed Temporary Roads
- 500-ft. Contour Interval
- 100-ft. Contour Interval





## CRANE and ROWAN MOUNTAIN UNIT PLAN

**VCU-UNIT.ALT** 402-29.2

Management Prescription: Timber Production

Acres Even Aged: 23

Natural Stand Condition: Understory Reinitiation

Acres 2-Aged: 0

Desired Future Condition Even aged

Acres Uneven Aged 0

Volume(MBF) 772.8

USGS 1/4 QUAD MAP #: PTA C1 NW

Aerial Photo: 77

Flight# 3A Photo#

8

### I. RESOURCE CONCERNS/OPPORTUNITIES - UNIT MANAGEMENT OBJECTIVES

Access "difficult" component of the ASQ - develop techniques for managing this component.  
Unit is sen from Rowan Bay - meet VQO of Modification.  
Southeast winds predominate - incorporate disturbance ecology principles  
Class IV stream extends up into unit.

### II. IMPLEMENTATION ACTIVITIES

#### A. ECOSYSTEMS MANAGEMENT:

##### 1. Vegetation:

Stand is understory reinitiation. Lower portion is multi-cohort, upper portion is 340 year old even aged dense stand with good spruce component. Small patch of 95 year old windthrow within stand from SE.

##### 2. Aquatic Habitat:

No Class I/II streams in Unit.  
No Class III streams in Unit.

Class IV: Provide adequate deflection to minimize soil disturbance by using tailtrees on ridge adjacent to the stream.  
Partially suspend logs over the stream.( BMP13.16 Stream Channel Protection)

##### 3. Wildlife Habitat:

Unit is in high deer HSI value and high Marten HIS value. South facing slope below 1000 feet in elevation. Reserve trees will be retained in all alternatives that prescribe even-aged management.

##### 4. Visuals:

Unit is within the Rowan Peak viewshed and is part of a long range multi-entry harvest scheme designed to work with natural features found in the landscape. Unit meets modification VQO as designed.

#### B. TRANSPORTATION SYSTEM:

Unit is not accessible by road due to steep topography. Planned helicopter unit will use landing in 402-28 or 402-49.

#### C. SILVICULTURAL PRESCRIPTION SUMMARY:

Evenage Clearcut with 15% retention of large wildlife legacy trees using helicopter yarding system, certify natural regeneration, pre-commercial thin to maintain healthy stand.

#### D. UNIT DESIGN:

Multi-entry plan for this hillside is to progressively harvest units into the wind.  
Northwest boundary of unit located on leeward side of ridge to afford topographic protection from southeast winds.  
Unit designed for helicopter yarding.





## CRANE and ROWAN MOUNTAIN UNIT PLAN

**VCU-UNIT.ALT** 402-29.3

Management Prescription: Timber Production

Acres Even Aged: 0

Natural Stand Condition: Understory Reinitiation

Acres 2-Aged: 23

Desired Future Condition 2-aged

Acres Uneven Aged 0

Volume(MBF) 437

USGS 1/4 QUAD MAP #: PTA C1 NW

Aerial Photo: 77

Flight# 3A

Photo#

8

### I. RESOURCE CONCERNS/OPPORTUNITIES - UNIT MANAGEMENT OBJECTIVES

Access "difficult" component of the ASQ - develop techniques for managing this component.

Unit is sen from Rowan Bay - meet VQO of Modification.

Southeast winds predominate - Incorporate disturbance ecology principles

Wildlife Habitat - Maintain legacy structure in unit where possible for prey species habitat through alternative silvicultural prescription.

Class IV stream extends up into unit.

### II. IMPLEMENTATION ACTIVITIES

#### **A. ECOSYSTEMS MANAGEMENT:**

##### **1. Vegetation:**

Stand is understory reinitiation. Lower portion is multi-cohort, upper portion is 340 year old even aged dense stand with good spruce component. Small patch of 95 year old windthrow within stand. (from SE)

##### **2. Aquatic Habitat:**

No Class I/II streams in Unit.

No Class III streams in Unit.

Class IV: Provide adequate deflection to minimize soil disturbance by using tailtrees on ridge adjacent to the stream. Partially suspend logs over the stream.( BMP13.16 Stream Channel Protection)

##### **3. Wildlife Habitat:**

Retain multi-cohort stand structure and legacy to provide necessary habitat characteristics for forest dwelling species. Unit will be harvested using alternative silvicultural prescriptions. This should exceed TLMP S&Gs.

##### **4. Visuals:**

Unit is within the Rowan Peak viewshed and is part of a long range multi-entry harvest scheme designed to work with natural features found in the landscape. Unit meets partial retention VQO as designed.

#### **B. TRANSPORTATION SYSTEM:**

Unit is not accessible by road due to steep topography. Planned helicopter unit will use landing in 402-28 or 402-49.

#### **C. SILVICULTURAL PRESCRIPTION SUMMARY:**

Seed Tree with Reserves using helicopter yarding, use upper and lower diameter limit Rx for hemlock and cedar. Reserve and plant 2 large spruce every 10 acres. Initial managed stand will have 3 cohorts;1) Young trees from regeneration harvest. 2) Small residuals left from lower dia. limit harvest 3) Large residual trees with high wildlife value. Over time, it is expected that a 2-aged stand will develop as large trees are removed through senescence and wind snap or by windthrow

#### **D. UNIT DESIGN:**

Multi-entry plan for this hillside is to progressively harvest units into the wind.

Northwest boundary of unit located on leeward side of ridge to afford topographic protection from southeast winds.

Unit designed for helicopter yarding.





## CRANE and ROWAN MOUNTAIN UNIT PLAN

**VCU-UNIT.ALT** 402-29.4

Management Prescription: Timber Production

Acres Even Aged: 0

Natural Stand Condition: Understory Reinitiation

Acres 2-Aged: 23

Desired Future Condition 2-aged

Acres Uneven Aged 0

Volume(MBF) 437

USGS 1/4 QUAD MAP #: PTA C1 NW

Aerial Photo: 77

Flight# 3A

Photo#

8

### I. RESOURCE CONCERNS/OPPORTUNITIES - UNIT MANAGEMENT OBJECTIVES

Access "difficult" component of the ASQ - develop techniques for managing this component.

Unit is sen from Rowan Bay - meet VQO of Modification.

Southeast winds predominate - incorporate disturbance ecology principles.

Wildlife Habitat - Maintain legacy structure in unit where possible for prey species habitat through alternative silvicultural prescription.

Class IV stream extends up into unit.

### II. IMPLEMENTATION ACTIVITIES

#### A. ECOSYSTEMS MANAGEMENT:

##### 1. Vegetation:

Stand is understory reinitiation. Lower portion is multi-cohort, upper portion is 340 year old even aged dense stand with good spruce component. Small patch of 95 year old windthrow within stand. (from SE).

##### 2. Aquatic Habitat:

No Class I/II streams in Unit.

No Class III streams in Unit.

Class IV: Provide adequate deflection to minimize soil disturbance by using tailtrees on ridge adjacent to the stream. Partially suspend logs over the stream.( BMP13.16 Stream Channel Protection)

##### 3. Wildlife Habitat:

Retain multi-cohort stand structure and legacy to provide necessary habitat characteristics for forest dwelling species. Unit will be harvested using alternative silvicultural prescriptions. This should exceed TLMP S&Gs.

##### 4. Visuals:

Unit is within the Rowan Peak viewshed and is part of a long range multi-entry harvest scheme designed to work with natural features found in the landscape. Unit meets partial retention VQO as designed.

#### B. TRANSPORTATION SYSTEM:

Unit is not accessible by road due to steep topography. Planned helicopter unit will use landing in 402-28 or 402-49.

#### C. SILVICULTURAL PRESCRIPTION SUMMARY:

Seed Tree with Reserves using helicopter yarding, use upper and lower diameter limit Rx for hemlock and cedar. Reserve and paint 2 large spruce every 10 acres. Initial managed stand will have 3 cohorts; 1) Young trees from regeneration harvest. 2) Small residuals left from lower dia. limit harvest 3) Large residual trees with high wildlife value. Over time, it is expected that a 2-aged stand will develop as large trees are removed through senescence and wind snap or by windthrow

#### D. UNIT DESIGN:

Multi-entry plan for this hillside is to progressively harvest units into the wind.

Northwest boundary of unit located on leeward side of ridge to afford topographic protection from southeast winds.

Unit designed for helicopter yarding.





CRANE and ROWAN MOUNTAIN UNIT PLAN

VCU-UNIT.ALT 402-29.5		Acres Even Aged:	0
Management Prescription: Timber Production		Acres 2-Aged:	23
Natural Stand Condition: Understory Reinitiation		Acres Uneven Aged	0
Desired Future Condition 2-aged		Volume(MBF)	437
USGS 1/4 QUAD MAP #: PTA C1 NW	Aerial Photo: 77	Flight# 3A	Photo# 8

I. RESOURCE CONCERNS/OPPORTUNITIES - UNIT MANAGEMENT OBJECTIVES

Access "difficult" component of the ASQ - develop techniques for managing this component.  
Unit is sen from Rowan Bay - meet VQO of Modification.  
Southeast winds predominate - incorporate disturbance ecology principles  
Class IV stream extends up into unit.  
Wildlife Habitat - Maintain legacy structure in unit where possible for prey species habitat through alternative silvicultural prescription.

II. IMPLEMENTATION ACTIVITIES

A. ECOSYSTEMS MANAGEMENT:

1. Vegetation:  
Stand is understory reinitiation. Lower portion is multi-cohort, upper portion is 340 year old even aged dense stand with good spruce component. Small patch of 95 year old windthrow within stand. (from SE).
2. Aquatic Habitat:  
No Class I/II streams in Unit.  
No Class III streams in Unit.

Class IV: Provide adequate deflection to minimize soil disturbance by using tailtrees on ridge adjacent to the stream.  
Partially suspend logs over the stream.( BMP13.16 Stream Channel Protection)

3. Wildlife Habitat:  
Retain multi-cohort stand structure and legacy to provide necessary habitat characteristics for forest dwelling species. Unit will be harvested using alternative silvicultural prescriptions. This should exceed TLMP S&Gs.
4. Visuals:  
Unit is within the Rowan Peak viewshed and is part of a long range multi-entry harvest scheme designed to work with natural features found in the landscape. Unit meets modification VQO as designed.

B. TRANSPORTATION SYSTEM:

Unit is not accessible by road due to steep topography. Planned helicopter unit will use landing in 402-28 or 402-49.

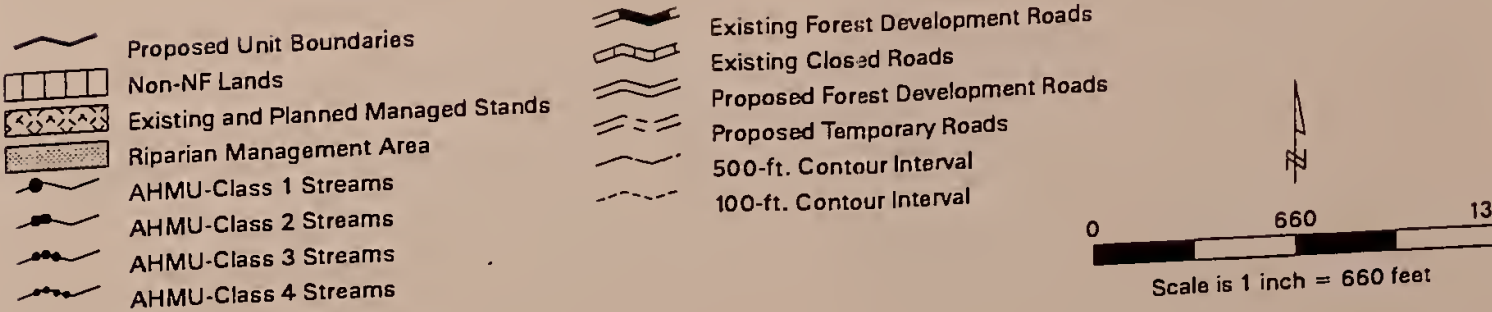
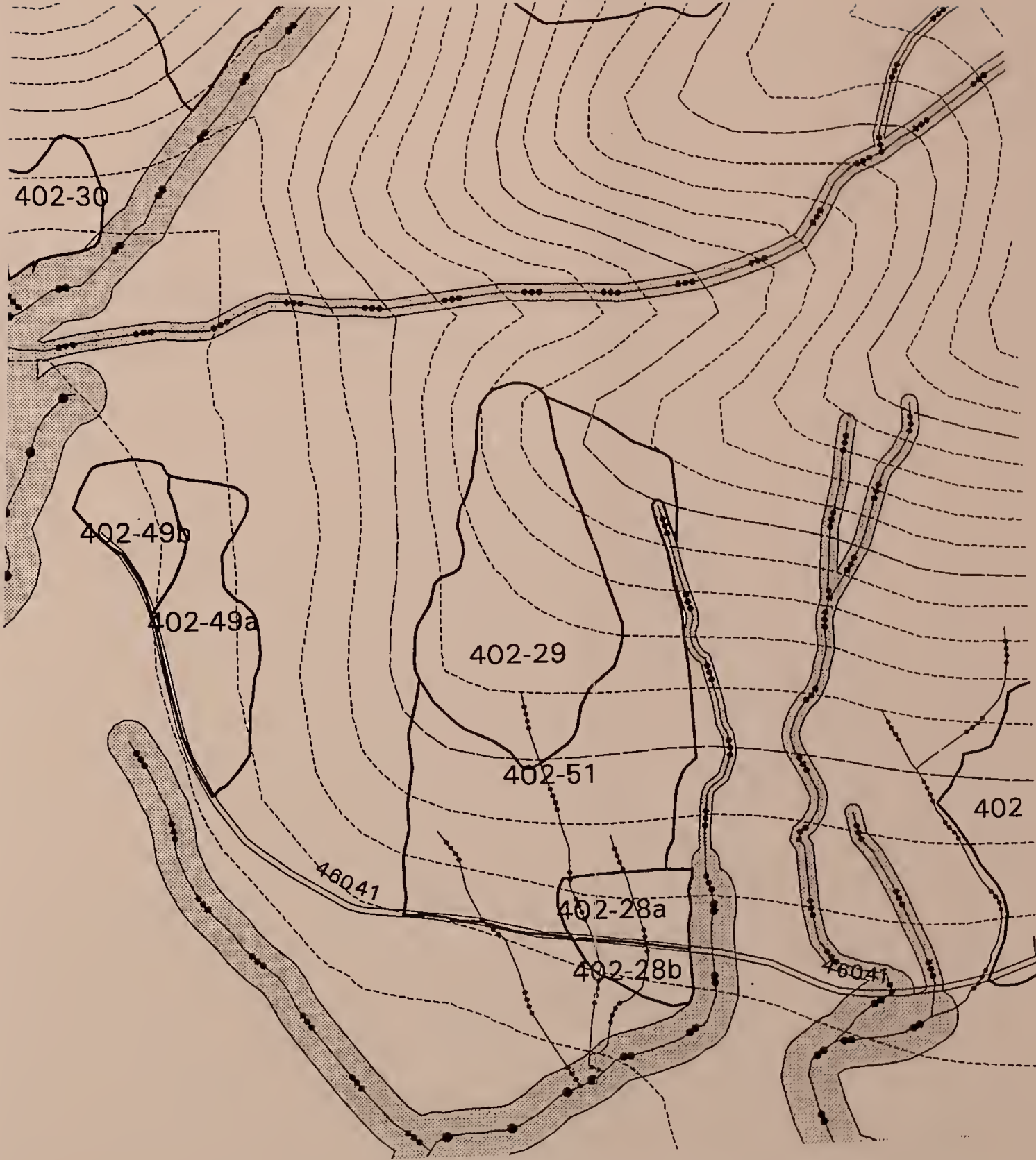
C. SILVICULTURAL PRESCRIPTION SUMMARY:

Seed Tree with Reserves using helicopter yarding, use upper and lower diameter limit Rx for hemlock and cedar. Reserve and paint 2 large spruce every 10 acres. Initial managed stand will have 3 cohorts;1) Young trees from regeneration harvest. 2) Small residuals left from lower dia. limit harvest 3) Large residual trees with high wildlife value. Over time, it is expected that a 2-aged stand will develop as large trees are removed through senescence and wind snap or by windthrow

D. UNIT DESIGN:

Multi-entry plan for this hillside is to progressively harvest units into the wind.  
Northwest boundary of unit located on leeward side of ridge to afford topographic protection from southeast winds.  
Unit designed for helicopter yarding.

Crane/Rowan Timber Harvest Unit 402-29







## CRANE and ROWAN MOUNTAIN UNIT PLAN

**VCU-UNIT.ALT 402-30.2**

Management Prescription: Timber Production

Acres Even Aged: 10

Natural Stand Condition: Understory Reinitiation

Acres 2-Aged: 0

Desired Future Condition Even aged

Acres Uneven Aged 0

Volume(MBF) 336

USGS 1/4 QUAD MAP #: PTA C2 NE

Aerial Photo: 77

Flight# 3A

Photo#

8

### I. RESOURCE CONCERNS/OPPORTUNITIES - UNIT MANAGEMENT OBJECTIVES

Unit is seen from saltwater - meet VQO of Modification.

Class I and II stream adjacent to unit - maintain riparian buffer.

Class III stream within unit - maintain stream channel stability.

Unit located near sandy beach - maintain beach fringe habitat and provide recreational access.

South winds predominate - incorporate disturbance ecology principles.

### II. IMPLEMENTATION ACTIVITIES

#### A. ECOSYSTEMS MANAGEMENT:

##### 1. Vegetation:

Stand is of wind origin in understory reinitiation stage.

##### 2. Aquatic Habitat:

Class I/II: No commercial harvest within 100 feet. No programmed commercial harvest within the RMA. Manage an appropriate distance beyond the no harvest zone to provide windfirmness. (BMP 12.6 Riparian Area Designation and Protection; BMP 13.16 Stream Channel Protection) Due to the orientation of the buffer to prevailing winds, it is expected to be windfirm.

Class III: No programmed commercial timber harvest within the V-notch (side-slope break). Manage an appropriate distance beyond the slope break for windfirmness. (BMP 12.6 Riparian Area Designation and Protection; BMP 13.16 Stream Channel Protection) The stream in the center of the unit is in the High Gradient Contained Process Group. Manage the area within 120 feet of the V-notch to provide for windfirmness of the no-cut buffer within the V-notch. South winds predominate.

##### 3. Wildlife Habitat:

Unit is in high deer HSI value and high Marten HIS value. South facing slope below 800 feet in elevation. Reserve trees will be retained in all alternatives that prescribe even-aged management.

##### 4. Visuals:

Unit is within the Rowan Peak viewshed and is part of a long range multi-entry harvest scheme designed to work with natural features found in the landscape. Unit meets partial retention VQO as designed.

#### B. TRANSPORTATION SYSTEM:

Planned helicopter unit will use landing in 402-49. This will avoid roading across several unstable class I alluvial stream channels.

#### C. SILVICULTURAL PRESCRIPTION SUMMARY:

Evenage Clearcut with 15% retention of large wildlife legacy trees using helicopter yarding system, certify natural regeneration, pre-commercial thin to maintain healthy stand.

#### D. UNIT DESIGN:

Unit designed to work with landslide and landform features.

Timber along upper slope backline is expected to retain windfirmness naturally developed against winds perpendicular to slope.

Class III buffer is expected to be windfirm since it is parallel to prevailing winds.





## CRANE and ROWAN MOUNTAIN UNIT PLAN

**VCU-UNIT.ALT 402-30.3**

Management Prescription: Timber Production

Acres Even Aged: 0

Natural Stand Condition: Understory Reinitiation

Acres 2-Aged: 10

Desired Future Condition 2-aged

Acres Uneven Aged 0

Volume(MBF) 190

USGS 1/4 QUAD MAP #: PTA C2 NE

Aerial Photo: 77

Flight# 3A

Photo#

8

### I. RESOURCE CONCERNS/OPPORTUNITIES - UNIT MANAGEMENT OBJECTIVES

Unit is seen from saltwater - meet VQO of Modification.

Class I and II stream adjacent to unit - maintain riparian buffer.

Class III stream within unit - maintain stream channel stability.

Unit located near sandy beach - maintain beach fringe habitat and provide recreational access.

South winds predominate - incorporate disturbance ecology principles.

Wildlife Habitat - Maintain legacy structure in unit where possible for prey species habitat through alternative silvicultural prescription.

### II. IMPLEMENTATION ACTIVITIES

#### A. ECOSYSTEMS MANAGEMENT:

##### 1. Vegetation:

Stand is of wind origin in understory reinitiation stage.

##### 2. Aquatic Habitat:

Class I/II: No commercial harvest within 100 feet. No programmed commercial harvest within the RMA. Manage an appropriate distance beyond the the no harvest zone to provide windfirmness. (BMP 12.6 Riparian Area Designation and Protection; BMP 13.16 Stream Channel Protection) Due to the orientation of the buffer to prevailing winds, it is expected to be windfirm.

Class III: No programmed commercial timber harvest within the V-notch (side-slope break). Manage an appropriate distance beyond the slope break for windfirmness. (BMP 12.6 Riparian Area Designation and Protection; BMP 13.16 Stream Channel Protection)

##### 3. Wildlife Habitat:

Retain multi-cohort stand structure and legacy to provide necessary habitat characteristics for forest dwelling species. Unit will be harvested using alternative silvicultural prescriptions. This should exceed TLMP S&Gs.

##### 4. Visuals:

Unit is within the Rowan Peak viewshed and is part of a long range multi-entry harvest scheme designed to work with natural features found in the landscape. Unit meets partial retention VQO as designed.

#### B. TRANSPORTATION SYSTEM:

Planned helicopter unit will use landing in 402-49. This will avoid roading across several unstable class I alluvial stream channels.

#### C. SILVICULTURAL PRESCRIPTION SUMMARY:

Seed Tree with Reserves using helicopter yarding, use upper and lower diameter limit Rx for hemlock and cedar. Reserve and paint 2 large spruce every 10 acres. Initial managed stand will have 3 cohorts; 1) Young trees from regeneration harvest. 2) Small residuals left from lower dia. limit harvest 3) Large residual trees with high wildlife value. Over time, it is expected that a 2-aged stand will develop as large trees are removed through senescence and wind snap or by windthrow

#### D. UNIT DESIGN:

Unit designed to work with landslide and landform features.

Timber along upper slope backline is expected to retain windfirmness naturally developed against winds perpendicular to slope.



## CRANE and ROWAN MOUNTAIN UNIT PLAN

**VCU-UNIT.ALT 402-30.4**

Management Prescription: Timber Production

Acres Even Aged: 0

Natural Stand Condition: Understory Reinitiation

Acres 2-Aged: 10

Desired Future Condition 2-aged

Acres Uneven Aged 0

Volume(MBF) 190

USGS 1/4 QUAD MAP #: PTA C2 NE

Aerial Photo: 77

Flight# 3A Photo#

8

### I. RESOURCE CONCERNS/OPPORTUNITIES - UNIT MANAGEMENT OBJECTIVES

Unit is seen from saltwater - meet VQO of Modification.

Class I and II stream adjacent to unit - maintain riparian buffer.

Class III stream within unit - maintain stream channel stability.

Unit located near sandy beach - maintain beach fringe habitat and provide recreational access.

South winds predominate - incorporate disturbance ecology principles.

Wildlife Habitat - Maintain legacy structure in unit where possible for prey species habitat through alternative silvicultural prescription.

### II. IMPLEMENTATION ACTIVITIES

#### A. ECOSYSTEMS MANAGEMENT:

##### 1. Vegetation:

Stand is of wind origin in understory reinitiation stage.

##### 2. Aquatic Habitat:

Class I/II: No commercial harvest within 100 feet. No programmed commercial harvest within the RMA. Manage an appropriate distance beyond the no harvest zone to provide windfirmness. (BMP 12.6 Riparian Area Designation and Protection; BMP 13.16 Stream Channel Protection) Due to the orientation of the buffer to prevailing winds, it is expected to be windfirm.

Class III: No programmed commercial timber harvest within the V-notch (side-slope break). Manage an appropriate distance beyond the slope break for windfirmness. (BMP 12.6 Riparian Area Designation and Protection; BMP 13.16 Stream Channel Protection)

##### 3. Wildlife Habitat:

Retain multi-cohort stand structure and legacy to provide necessary habitat characteristics for forest dwelling species. Unit will be harvested using alternative silvicultural prescriptions. This should exceed TLMP S&Gs.

##### 4. Visuals:

Unit is within the Rowan Peak viewshed and is part of a long range multi-entry harvest scheme designed to work with natural features found in the landscape. Unit meets partial retention VQO as designed.

#### B. TRANSPORTATION SYSTEM:

Planned helicopter unit will use landing in 402-49. This will avoid roading across several unstable class I alluvial stream channels.

#### C. SILVICULTURAL PRESCRIPTION SUMMARY:

Seed Tree with Reserves using helicopter yarding, use upper and lower diameter limit Rx for hemlock and cedar. Reserve and plant 2 large spruce every 10 acres. Initial managed stand will have 3 cohorts; 1) Young trees from regeneration harvest. 2) Small residuals left from lower dia. limit harvest 3) Large residual trees with high wildlife value. Over time, it is expected that a 2-aged stand will develop as large trees are removed through senescence and wind snap or by windthrow

#### D. UNIT DESIGN:

Unit designed to work with landslide and landform features.

Timber along upper slope backline is expected to retain windfirmness naturally developed against winds perpendicular to slope.

Class III buffer is expected to be windfirm since it is parallel to prevailing winds.





CRANE and ROWAN MOUNTAIN UNIT PLAN

**VCU-UNIT.ALT 402-30.5**

Management Prescription: **Timber Production**  
Natural Stand Condition: **Understory Reinitiation**  
Desired Future Condition **Even aged**

Acres Even Aged: 10  
Acres 2-Aged: 0  
Acres Uneven Aged 0  
Volume(MBF) 336

USGS 1/4 QUAD MAP #: **PTA C2 NE**

Aerial Photo: 77 Flight# 3A Photo# 8

**I. RESOURCE CONCERNS/OPPORTUNITIES - UNIT MANAGEMENT OBJECTIVES**

Unit is seen from saltwater - meet VQO of Modification.  
Class I and II stream adjacent to unit - maintain riparian buffer.  
Class III stream within unit - maintain stream channel stability.  
Unit located near sandy beach - maintain beach fringe habitat and provide recreational access.  
South winds predominate - incorporate disturbance ecology principles.

**II. IMPLEMENTATION ACTIVITIES**

**A. ECOSYSTEMS MANAGEMENT:**

1. Vegetation:  
Stand is of wind origin in understory reinitiation stage.
2. Aquatic Habitat:  
Class I/II: No commercial harvest within 100 feet. No programmed commercial harvest within the RMA. Manage an appropriate distance beyond the the no harvest zone to provide windfirmness. (BMP 12.6 Riparian Area Designation and Protection; BMP 13.16 Stream Channel Protection) Due to the orientation of the buffer to prevailing winds, it is expected to be windfirm.  
Class III: No programmed commercial timber harvest within the V-notch (side-slope break). Manage an appropriate distance beyond the slope break for windfirmness. (BMP 12.6 Riparian Area Designation and Protection; BMP 13.16 Stream Channel Protection)
3. Wildlife Habitat:  
Unit is in high deer HSI value and high Marten HSI value. South facing slope below 800 feet in elevation. Reserve trees will be retained in all alternatives that prescribe even-aged management.
4. Visuals:  
Unit is within the Rowan Peak viewshed and is part of a long range multi-entry harvest scheme designed to work with natural features found in the landscape. Unit meets partial retention VQO as designed.

**B. TRANSPORTATION SYSTEM:**

Planned helicopter unit will use landing in 402-49. This will avoid roading across several unstable class I alluvial stream channels.

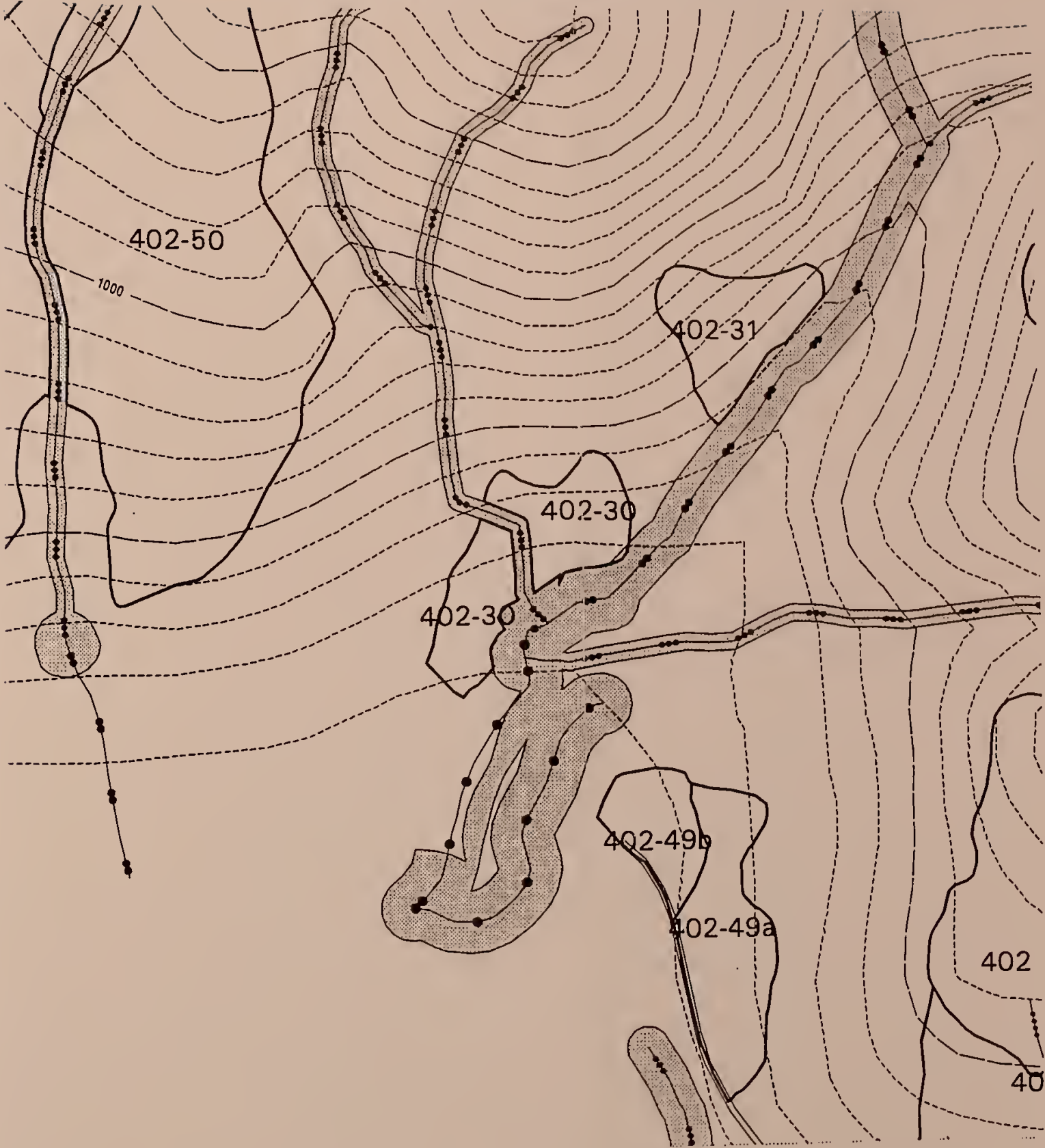
**C. SILVICULTURAL PRESCRIPTION SUMMARY:**

Evenage Clearcut with 15% retention of large wildlife legacy trees using helicopter yarding system, certify natural regeneration, pre-commercial thin to maintain healthy stand.

**D. UNIT DESIGN:**

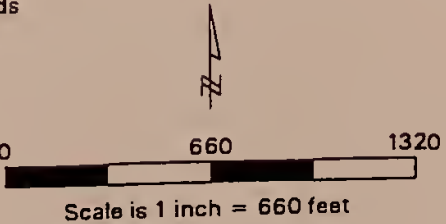
Unit designed to work with landslide and landform features.  
Timber along upper slope backline is expected to retain windfirmness naturally developed against winds perpendicular to slope.  
Class III buffer is expected to be windfirm since it is parallel to prevailing winds.

Crane/Rowan Timber Harvest Unit 402-30



- Proposed Unit Boundaries
- Non-NF Lands
- Existing and Planned Managed Stands
- Riparian Management Area
- AHMu-Class 1 Streams
- AHMu-Class 2 Streams
- AHMu-Class 3 Streams
- AHMu-Class 4 Streams

- Existing Forest Development Roads
- Existing Closed Roads
- Proposed Forest Development Roads
- Proposed Temporary Roads
- 500-ft. Contour Interval
- 100-ft. Contour Interval







# CRANE and ROWAN MOUNTAIN UNIT PLAN

**VCU-UNIT.ALT** 402-31.3

Management Prescription: Timber Production

Acres Even Aged: 0

Natural Stand Condition: Understory Reinitiation

Acres 2-Aged: 8

Desired Future Condition 2-aged

Acres Uneven Aged 0

Volume(MBF) 152

USGS 1/4 QUAD MAP #: PTA C2 NE

Aerial Photo: 77

Flight# 3A Photo#

7

## I. RESOURCE CONCERNS/OPPORTUNITIES - UNIT MANAGEMENT OBJECTIVES

Unit visible from saltwater - maintain VQO of Partial Retention.

Class II stream on the southeast side of unit - maintain riparian buffer.

South winds predominate - incorporate disturbance ecology principles.

Wildlife Habitat - Maintain legacy structure in unit where possible for prey species habitat through alternative silvicultural prescription.

## II. IMPLEMENTATION ACTIVITIES

### A. ECOSYSTEMS MANAGEMENT:

#### 1. Vegetation:

Stand is of wind origin in understory reinitiation stage.

#### 2. Aquatic Habitat:

Class I/II: No commercial harvest within 100 feet. No programmed commercial harvest within the RMA. Manage an appropriate distance beyond the no harvest zone to provide windfirmness. (BMP 12.6 Riparian Area Designation and Protection; BMP 13.16 Stream Channel Protection) The stream along the unit boundary is in the High Gradient Contained Process Group. Manage the area within 120 feet of the no-cut buffer to provide for windfirmness. Since south winds predominate, the no-cut buffer should be windfirm.

No Class III streams in Unit.

#### 3. Wildlife Habitat:

Retain multi-cohort stand structure and legacy to provide necessary habitat characteristics for forest dwelling species. Unit will be harvested using alternative silvicultural prescriptions. This should exceed TLMP S&Gs.

#### 4. Visuals:

Unit is within the Rowan Peak viewshed and is part of a long range multi-entry harvest scheme designed to work with natural features found in the landscape. Unit meets partial retention VQO as designed.

### B. TRANSPORTATION SYSTEM:

Planned helicopter unit will use landing in 402-49. Accessing this small unit by road would require approximately 400 feet of full bench and end haul construction, in addition to crossing several unstable class I alluvial stream channels.

### C. SILVICULTURAL PRESCRIPTION SUMMARY:

Seed Tree with Reserves using helicopter yarding, use upper and lower diameter limit Rx for hemlock and cedar. Reserve and plant 2 large spruce every 10 acres. Initial managed stand will have 3 cohorts; 1) Young trees from regeneration harvest. 2) Small residuals left from lower dia. limit harvest 3) Large residual trees with high wildlife value. Over time, it is expected that a 2-aged stand will develop as large trees are removed through senescence and wind snap or by windthrow

### D. UNIT DESIGN:

Small size and location of unit meets the Partial Retention VQO.

Unit not at risk to windthrow due to location and small size.

Unit designed for helicopter yarding.



## CRANE and ROWAN MOUNTAIN UNIT PLAN

**VCU-UNIT.ALT** 402-31.4

Management Prescription: Timber Production

Acres Even Aged: 0

Natural Stand Condition: Understory Reinitiation

Acres 2-Aged: 8

Desired Future Condition 2-aged

Acres Uneven Aged 0

Volume(MBF) 152

USGS 1/4 QUAD MAP #: PTA C2 NE

Aerial Photo: 77

Flight# 3A Photo#

7

### I. RESOURCE CONCERNS/OPPORTUNITIES - UNIT MANAGEMENT OBJECTIVES

Unit visible from saltwater - maintain VQO of Partial Retention.

Class II stream on the southeast side of unit - maintain riparian buffer.

South winds predominate - incorporate disturbance ecology principles.

Wildlife Habitat - Maintain legacy structure in unit where possible for prey species habitat through alternative silvicultural prescription.

### II. IMPLEMENTATION ACTIVITIES

#### A. ECOSYSTEMS MANAGEMENT:

##### 1. Vegetation:

Stand is of wind origin in understory reinitiation stage.

##### 2. Aquatic Habitat:

Class I/II: No commercial harvest within 100 feet. No programmed commercial harvest within the RMA. Manage an appropriate distance beyond the no harvest zone to provide windfirmness. (BMP 12.6 Riparian Area Designation and Protection; BMP 13.16 Stream Channel Protection) The stream along the unit boundary is in the High Gradient Contained Process Group. Manage the area within 120 feet of the no-cut buffer to provide for windfirmness. Since south winds predominate, the no-cut buffer should be windfirm.

No Class III streams in Unit.

##### 3. Wildlife Habitat:

Retain multi-cohort stand structure and legacy to provide necessary habitat characteristics for forest dwelling species. Unit will be harvested using alternative silvicultural prescriptions. This should exceed TLMP S&Gs.

##### 4. Visuals:

Unit is within the Rowan Peak viewshed and is part of a long range multi-entry harvest scheme designed to work with natural features found in the landscape. Unit meets partial retention VQO as designed.

#### B. TRANSPORTATION SYSTEM:

Planned helicopter unit will use landing in 402-49. Accessing this small unit by road would require approximately 400 feet of full bench and end haul construction, in addition to crossing several unstable class I alluvial stream channels.

#### C. SILVICULTURAL PRESCRIPTION SUMMARY:

Seed Tree with Reserves using helicopter yarding, use upper and lower diameter limit Rx for hemlock and cedar. Reserve and plant 2 large spruce every 10 acres. Initial managed stand will have 3 cohorts; 1) Young trees from regeneration harvest. 2) Small residuals left from lower dia. limit harvest 3) Large residual trees with high wildlife value. Over time, it is expected that a 2-aged stand will develop as large trees are removed through senescence and wind snap or by windthrow

#### D. UNIT DESIGN:

Small size and location of unit meets the Partial Retention VQO.

Unit not at risk to windthrow due to location and small size.

Unit designed for helicopter yarding.





CRANE and ROWAN MOUNTAIN UNIT PLAN

VCU-UNIT.ALT

402-31.5

Management Prescription: Timber Production

Natural Stand Condition: Understory Reinitiation

Desired Future Condition Even aged

Acres Even Aged: 8

Acres 2-Aged: 0

Acres Uneven Aged 0

Volume(MBF) 268.8

USGS 1/4 QUAD MAP #: PTA C2 NE

Aerial Photo: 77

Flight# 3A

Photo# 7

I. RESOURCE CONCERNS/OPPORTUNITIES - UNIT MANAGEMENT OBJECTIVES

Unit visible from saltwater - maintain VQO of Partial Retention.

Class II stream on the southeast side of unit - maintain riparian buffer.

South winds predominate - incorporate disturbance ecology principles.

II. IMPLEMENTATION ACTIVITIES

A. ECOSYSTEMS MANAGEMENT:

1. Vegetation:

Stand is of wind origin in understory reinitiation stage.

2. Aquatic Habitat:

Class I/II: No commercial harvest within 100 feet. No programmed commercial harvest within the RMA. Manage an appropriate distance beyond the the no harvest zone to provide windfirmness. (BMP 12.6 Riparian Area Designation and Protection; BMP 13.16 Stream Channel Protection) The stream along the unit boundary is in the High Gradient Contained Process Group. Manage the area within 120 feet of the no-cut buffer to provide for windfirmness. Since south winds predominate, the no-cut buffer should be windfirm.

No Class III streams in Unit.

3. Wildlife Habitat:

Unit is in high deer HSI value and high Marten HIS value. South facing slope below 1300 feet in elevation. Reserve trees will be retained in all alternatives that prescribe even-aged management.

4. Visuals:

Unit is within the Rowan Peak viewshed and is part of a long range multi-entry harvest scheme designed to work with natural features found in the landscape. Unit meets partial retention VQO as designed.

B. TRANSPORTATION SYSTEM:

Planned helicopter unit will use landing in 402-49. Accessing this small unit by road would require approximately 400 feet of full bench and end haul construction, in addition to crossing several unstable class I alluvial stream channels.

C. SILVICULTURAL PRESCRIPTION SUMMARY:

Evenage Clearcut with 15% retention of large wildlife legacy trees using helicopter yarding system, certify natural regeneration, pre-commercial thin to maintain healthy stand.

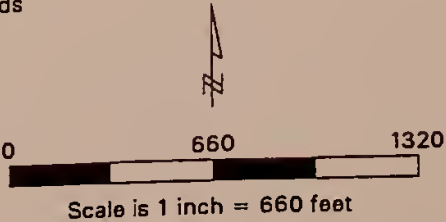
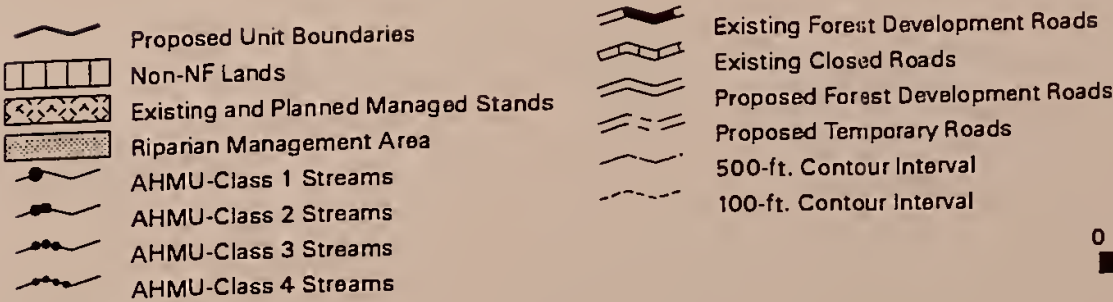
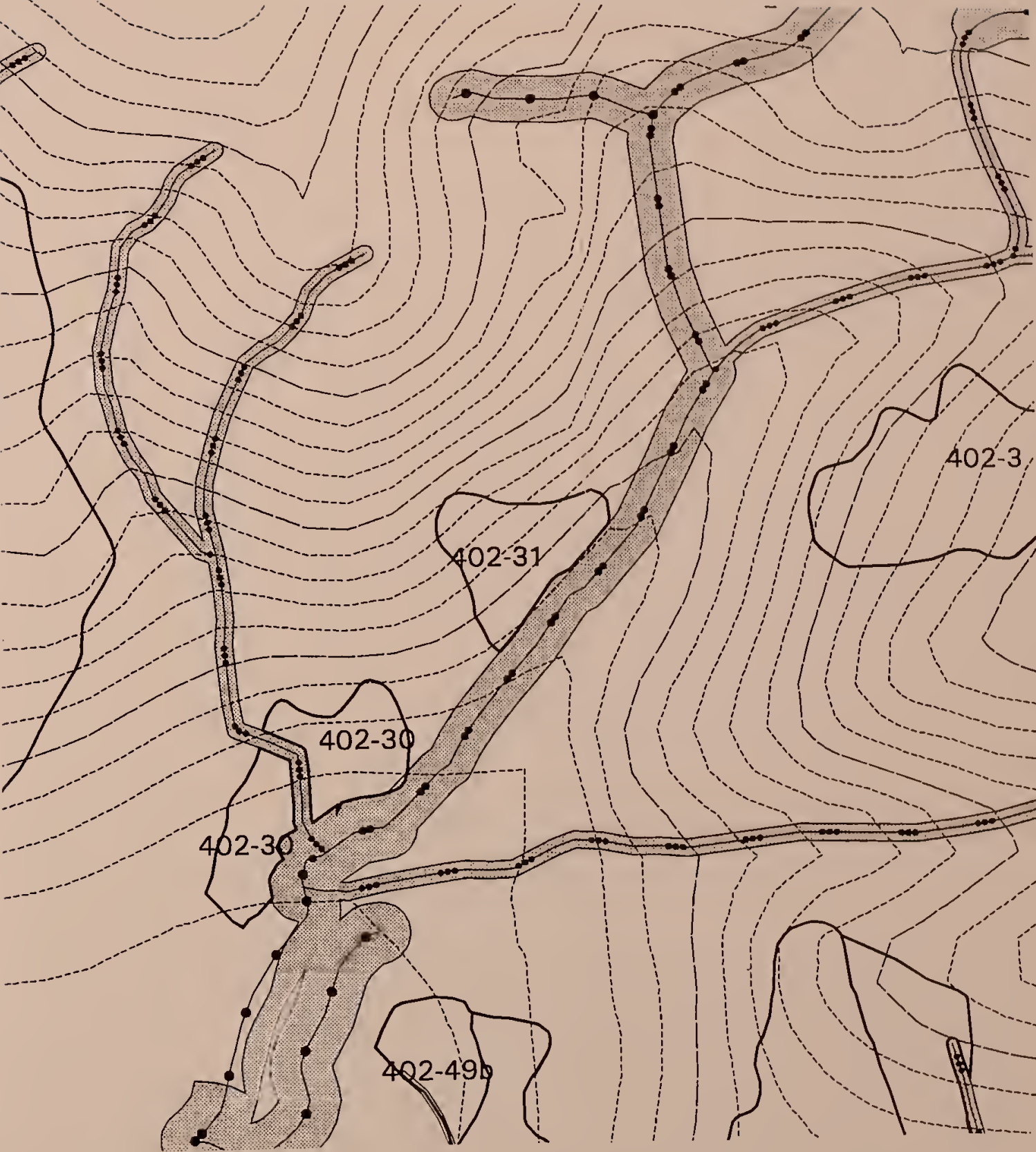
D. UNIT DESIGN:

Small size and location of unit meets the Partial Retention VQO.

Unit not at risk to windthrow due to location and small size.

Unit designed for helicopter yarding.

Crane/Rowan Timber Harvest Unit 402-31







## CRANE and ROWAN MOUNTAIN UNIT PLAN

**VCU-UNIT.ALT** 402-32.2

Management Prescription: Timber Production

Acres Even Aged: 22

Natural Stand Condition: Understory Reinitiation

Acres 2-Aged: 0

Desired Future Condition: Even aged

Acres Uneven Aged: 0

Volume(MBF) 739.2

USGS 1/4 QUAD MAP #: PTA C1 NW

Aerial Photo: 77

Flight#

3A

Photo#

7

### I. RESOURCE CONCERNS/OPPORTUNITIES - UNIT MANAGEMENT OBJECTIVES

Unit visible from saltwater - meet VQO of Partial Retention.  
Moderately unstable soils in entire unit - maintain soil stability.  
South winds predominate - incorporate disturbance ecology principles.  
No streams in unit.

### II. IMPLEMENTATION ACTIVITIES

#### A. ECOSYSTEMS MANAGEMENT:

##### 1. Vegetation:

Stand is of wind origin in understory reinitiation stage.

##### 2. Aquatic Habitat:

No Class I/II streams in Unit.

No Class III streams in Unit.

##### 3. Wildlife Habitat:

Retain multi-cohort stand structure and legacy to provide necessary habitat characteristics for forest dwelling species. Unit will be harvested using alternative silvicultural prescriptions. This should exceed TLMP S&Gs.

##### 4. Visuals:

Unit is within the Rowan Peak viewshed and is part of a long range multi-entry harvest scheme designed to work with natural features found in the landscape. Unit meets modification VQO as designed.

#### B. TRANSPORTATION SYSTEM:

Unit is not accessible by road due to steep topography. Planned helicopter unit will use landing in 400-49.

#### C. SILVICULTURAL PRESCRIPTION SUMMARY:

Evenage Clearcut with 15% retention of large wildlife legacy trees using helicopter yarding system, certify natural regeneration, pre-commercial thin to maintain healthy stand.

#### D. UNIT DESIGN:

The small size and irregular boundary helps the unit blend with patterns found in the characteristic landscape.  
Full suspension required to protect unstable soils.  
Unit is located on leeward side of ridge to protect it from winds.  
Unit designed for helicopter yarding.



## CRANE and ROWAN MOUNTAIN UNIT PLAN

**VCU-UNIT.ALT** 402-32.3

Management Prescription: Timber Production

Acres Even Aged: 0

Natural Stand Condition: Understory Reinitiation

Acres 2-Aged: 22

Desired Future Condition 2-aged

Acres Uneven Aged 0

Volume(MBF) 418

USGS 1/4 QUAD MAP #: PTA C1 NW

Aerial Photo: 77

Flight# 3A

Photo#

7

### I. RESOURCE CONCERNS/OPPORTUNITIES - UNIT MANAGEMENT OBJECTIVES

Unit visible from saltwater - meet VQO of Partial Retention.

Moderately unstable soils in entire unit - maintain soil stability.

South winds predominate - incorporate disturbance ecology principles.

Wildlife Habitat - Maintain legacy structure in unit where possible for prey species habitat through alternative silvicultural prescription.

No streams in unit.

### II. IMPLEMENTATION ACTIVITIES

#### A. ECOSYSTEMS MANAGEMENT:

##### 1. Vegetation:

Stand is of wind origin in understory reinitiation stage.

##### 2. Aquatic Habitat:

No Class I/II streams in Unit.

No Class III streams in Unit.

##### 3. Wildlife Habitat:

Retain multi-cohort stand structure and legacy to provide necessary habitat characteristics for forest dwelling species. Unit will be harvested using alternative silvicultural prescriptions. This should exceed TLMP S&Gs.

##### 4. Visuals:

Unit is within the Rowan Peak viewshed and is part of a long range multi-entry harvest scheme designed to work with natural features found in the landscape. Unit meets partial retention VQO as designed.

#### B. TRANSPORTATION SYSTEM:

Unit is not accessible by road due to steep topography. Planned helicopter unit will use landing in 400-49.

#### C. SILVICULTURAL PRESCRIPTION SUMMARY:

Seed Tree with Reserves using helicopter yarding, use upper and lower diameter limit Rx for hemlock and cedar. Reserve and plant 2 large spruce every 10 acres. Initial managed stand will have 3 cohorts; 1) Young trees from regeneration harvest. 2) Small residuals left from lower dia. limit harvest 3) Large residual trees with high wildlife value. Over time, it is expected that a 2-aged stand will develop as large trees are removed through senescence and wind snap or by windthrow

#### D. UNIT DESIGN:

The small size and irregular boundary helps the unit blend with patterns found in the characteristic landscape.

Full suspension required to protect unstable soils.

Unit is located on leeward side of ridge to protect it from winds.

Unit designed for helicopter yarding.





## CRANE and ROWAN MOUNTAIN UNIT PLAN

**VCU-UNIT.ALT** 402-32.4

Acres Even Aged: 0

Management Prescription: Timber Production

Acres 2-Aged: 22

Natural Stand Condition: Understory Reinitiation

Acres Uneven Aged 0

Desired Future Condition 2-aged

Volume(MBF) 418

USGS 1/4 QUAD MAP #: PTA C1 NW

Aerial Photo: 77

Flight# 3A

Photo#

7

### I. RESOURCE CONCERNS/OPPORTUNITIES - UNIT MANAGEMENT OBJECTIVES

Unit visible from saltwater - meet VQO of Partial Retention.

Moderately unstable soils in entire unit - maintain soil stability.

South winds predominate - incorporate disturbance ecology principles.

Wildlife Habitat - Maintain legacy structure in unit where possible for prey species habitat through alternative silvicultural prescription.

No streams in unit.

### II. IMPLEMENTATION ACTIVITIES

#### A. ECOSYSTEMS MANAGEMENT:

##### 1. Vegetation:

Stand is of wind origin in understory reinitiation stage.

##### 2. Aquatic Habitat:

No Class I/II streams in Unit.

No Class III streams in Unit.

##### 3. Wildlife Habitat:

Retain multi-cohort stand structure and legacy to provide necessary habitat characteristics for forest dwelling species. Unit will be harvested using alternative silvicultural prescriptions. This should exceed TLMP S&Gs.

##### 4. Visuals:

Unit is within the Rowan Peak viewshed and is part of a long range multi-entry harvest scheme designed to work with natural features found in the landscape. Unit meets partial retention VQO as designed.

#### B. TRANSPORTATION SYSTEM:

Unit is not accessible by road due to steep topography. Planned helicopter unit will use landing in 400-49.

#### C. SILVICULTURAL PRESCRIPTION SUMMARY:

Seed Tree with Reserves using helicopter yarding, use upper and lower diameter limit Rx for hemlock and cedar. Reserve and plant 2 large spruce every 10 acres. Initial managed stand will have 3 cohorts; 1) Young trees from regeneration harvest. 2) Small residuals left from lower dia. limit harvest 3) Large residual trees with high wildlife value. Over time, it is expected that a 2-aged stand will develop as large trees are removed through senescence and wind snap or by windthrow

#### D. UNIT DESIGN:

The small size and irregular boundary helps the unit blend with patterns found in the characteristic landscape.

Full suspension required to protect unstable soils.

Unit is located on leeward side of ridge to protect it from winds.

Unit designed for helicopter yarding.





**VCU-UNIT.ALT** 402-32.5

Management Prescription: Timber Production  
Natural Stand Condition: Understory Reinitiation  
Desired Future Condition Even aged

Acres Even Aged: 22  
Acres 2-Aged: 0  
Acres Uneven Aged 0  
Volume(MBF) 739.2  
Aerial Photo: 77 Flight# 3A Photo# 7

USGS 1/4 QUAD MAP #: PTA C1 NW

**I. RESOURCE CONCERNS/OPPORTUNITIES - UNIT MANAGEMENT OBJECTIVES**

Unit visible from saltwater - meet VQO of Partial Retention.  
Moderately unstable soils in entire unit - maintain soil stability.  
South winds predominate - incorporate disturbance ecology principles.  
No streams in unit.

**II. IMPLEMENTATION ACTIVITIES**

**A. ECOSYSTEMS MANAGEMENT:**

- 1. Vegetation:  
Stand is of wind origin in understory reinitiation stage.
- 2. Aquatic Habitat:  
No Class I/II streams in Unit.  
No Class III streams in Unit.
- 3. Wildlife Habitat:  
Unit is in high deer HSI value and high Marten HIS value. South facing slope below 1500 feet in elevation. Reserve trees will be retained in all alternatives that prescribe even-aged management.
- 4. Visuals:  
Unit is within the Rowan Peak viewshed and is part of a long range multi-entry harvest scheme designed to work with natural features found in the landscape. Unit meets modification VQO as designed.

**B. TRANSPORTATION SYSTEM:**

Unit is not accessible by road due to steep topography. Planned helicopter unit will use landing in 400-49.

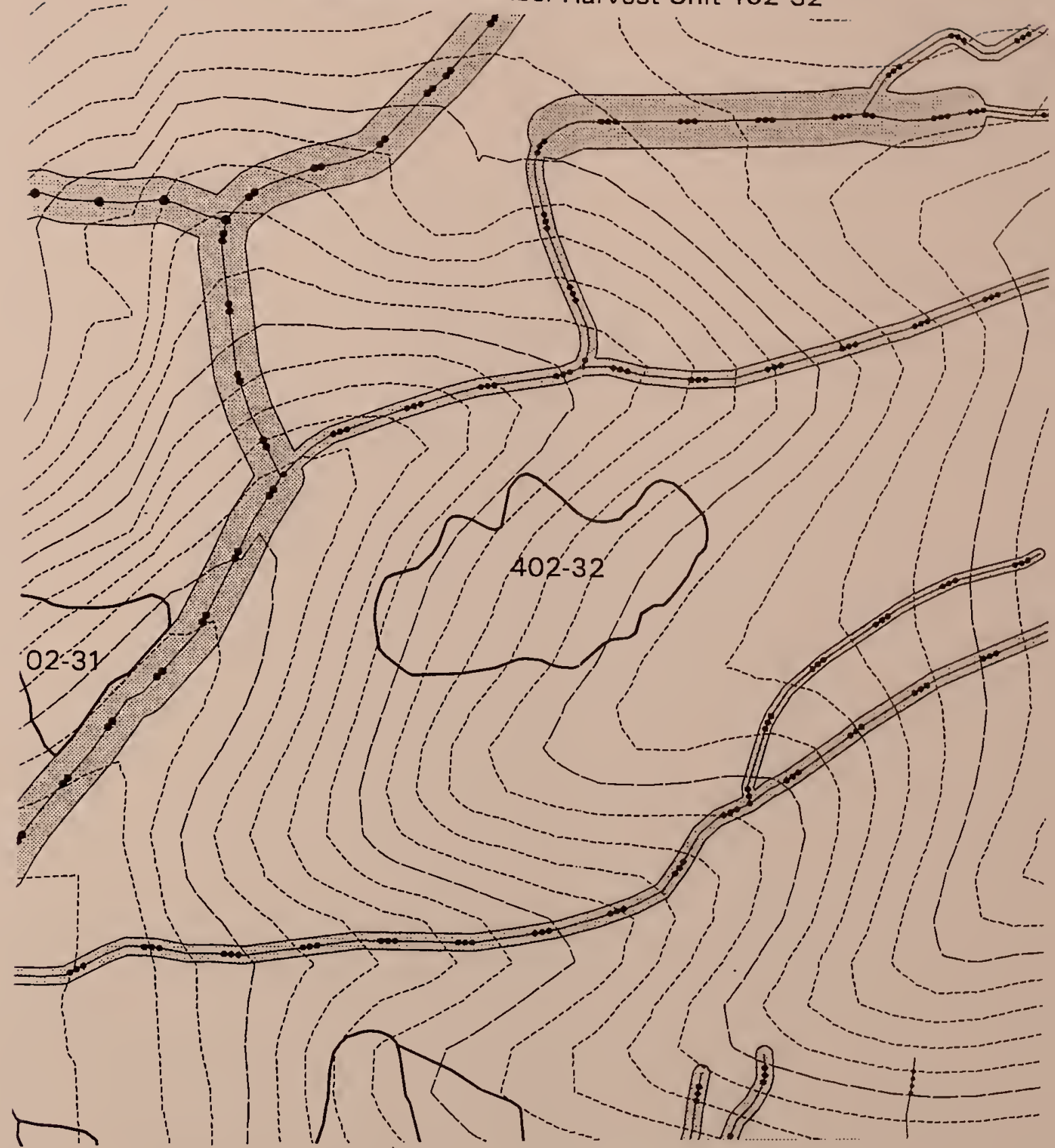
**C. SILVICULTURAL PRESCRIPTION SUMMARY:**

Evenage Clearcut with 15% retention of large wildlife legacy trees using helicopter yarding system, certify natural regeneration, pre-commercial thin to maintain healthy stand.

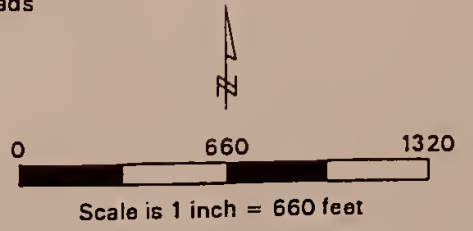
**D. UNIT DESIGN:**

The small size and irregular boundary helps the unit blend with patterns found in the characteristic landscape.  
Full suspension required to protect unstable soils.  
Unit is located on leeward side of ridge to protect it from winds.  
Unit designed for helicopter yarding.

Crane/Rowan Timber Harvest Unit 402-32



- |  |                                     |  |                                   |
|--|-------------------------------------|--|-----------------------------------|
|  | Proposed Unit Boundaries            |  | Existing Forest Development Roads |
|  | Non-NF Lands                        |  | Existing Closed Roads             |
|  | Existing and Planned Managed Stands |  | Proposed Forest Development Roads |
|  | Riparian Management Area            |  | Proposed Temporary Roads          |
|  | AHMU-Class 1 Streams                |  | 500-ft. Contour Interval          |
|  | AHMU-Class 2 Streams                |  | 100-ft. Contour Interval          |
|  | AHMU-Class 3 Streams                |  |                                   |
|  | AHMU-Class 4 Streams                |  |                                   |





# CRANE and ROWAN MOUNTAIN UNIT PLAN

**VCU-UNIT.ALT 402-49.2**

Management Prescription: Timber Production

Acres Even Aged: 15

Natural Stand Condition: Old Growth

Acres 2-Aged: 0

Desired Future Condition Even aged

Acres Uneven Aged 0

Volume(MBF) 504

USGS 1/4 QUAD MAP #: PTA C2 NE

Aerial Photo: 77

Flight# 3A Photo#

8

## I. RESOURCE CONCERNS/OPPORTUNITIES - UNIT MANAGEMENT OBJECTIVES

Unit located near beach - maintain beach fringe habitat.  
Estuary habitat south of unit - maintain wildlife habitat.  
Unit is seen from saltwater - meet VQO of Modification.  
Southerly winds predominate - incorporate disturbance ecology principles.  
No streams in unit.

## II. IMPLEMENTATION ACTIVITIES

### A. ECOSYSTEMS MANAGEMENT:

#### 1. Vegetation:

Stand has no apparent cohorts. Average site.

#### 2. Aquatic Habitat:

No Class I/II streams in Unit.

No Class III streams in Unit.

#### 3. Wildlife Habitat:

Unit is in high deer HSI value and high Marten HIS value. South facing slope below 500 feet in elevation. Reserve trees will be retained in all alternatives that prescribe even-aged management.

#### 4. Visuals:

Unit is within the Rowan Peak viewshed and is part of a long range multi-entry harvest scheme designed to work with natural features found in the landscape. Unit meets partial retention VQO as designed.

### B. TRANSPORTATION SYSTEM:

The temporary spur continuing on from 402-28 ends at the landing for the northern cable setting (402-49b). The landing for this unit will also serve helicopter units 402-30,31,32 & 50. All drainage structures will be removed from the temporary spur to restore natural drainage patterns. Additional waterbars will be added as needed, and all areas of exposed soil will be grass seeded.

### C. SILVICULTURAL PRESCRIPTION SUMMARY:

(a) is Evenaged Clearcut with 15% retention of large wildlife legacy trees using downhill cable yarding system, certify natural regeneration, pre-commercial thin to maintain healthy stand. (b) is same as (a) with uphill cable yarding.

### D. UNIT DESIGN:

Maintain irregular backline to meet visual objectives.  
Northern boundary adjacent to landslide provides protection from windthrow.





# CRANE and ROWAN MOUNTAIN UNIT PLAN

**VCU-UNIT.ALT 402-49.3**

Management Prescription: Timber Production

Acres Even Aged: 10

Natural Stand Condition: Old Growth

Acres 2-Aged: 5

Desired Future Condition Even aged, 2-aged mixture

Acres Uneven Aged 0

Volume(MBF) 431

USGS 1/4 QUAD MAP #: PTA C2 NE

Aerial Photo: 77

Flight# 3A Photo#

8

## I. RESOURCE CONCERNS/OPPORTUNITIES - UNIT MANAGEMENT OBJECTIVES

Unit located near beach - maintain beach fringe habitat.

Estuary habitat south of unit - maintain wildlife habitat.

Unit is seen from saltwater - meet VQO of Modification.

Southerly winds predominate -incorporate disturbance ecology principles.

Wildlife Habitat - Maintain legacy structure in unit where possible for prey species habitat through alternative silvicultural prescription.

No streams in unit.

## II. IMPLEMENTATION ACTIVITIES

### A. ECOSYSTEMS MANAGEMENT:

#### 1. Vegetation:

Stand has no apparent cohorts. Average site.

#### 2. Aquatic Habitat:

No Class I/II streams in Unit.

No Class III streams in Unit.

#### 3. Wildlife Habitat:

Unit is in high deer HSI value and high Marten HIS value. South facing slope below 500 feet in elevation. Reserve trees will be retained in all alternatives that prescribe even-aged management. Retain multi-cohort stand structure and legacy to provide necessary habitat characteristics for forest dwelling species. Part of the unit will be harvested using alternative silvicultural prescriptions. This should exceed TLMP S&Gs.

#### 4. Visuals:

Unit is within the Rowan Peak viewshed and is part of a long range multi-entry harvest scheme designed to work with natural features found in the landscape. Unit meets partial retention VQO as designed.

### B. TRANSPORTATION SYSTEM:

The temporary spur continuing on from 402-28 ends at the landing for the northern cable setting (402-49b). The landing for this unit will also serve helicopter units 402-30,31,32 &50. All drainage structures will be removed from the temporary spur to restore natural drainage patterns. Additional waterbars will be added as needed, and all areas of exposed soil will be grass seeded.

### C. SILVICULTURAL PRESCRIPTION SUMMARY:

(a) is Clearcut with 15% retention of large wildlife legacy trees using downhill cable yarding system, certify natural regeneration, pre-commercial thin to maintain healthy stand. (b) is 2-aged Seedtree with reserves (upper and lower diameter limit Rx for hemlock and cedar, paint for reserve 2 large spruce every 10 acres) using uphill running skyline cable yarding system, certify natural regeneration, pre-commercial thin to maintain healthy stand. Initial managed stand will have 3 cohorts; 1) Young trees from regeneration harvest. 2) Small residuals left from lower dia. limit harvest 3) Large residual trees with high wildlife value. Over time, it is expected that a 2-aged stand will develop as large trees are removed through senescence and wind snap or by windthrow

### D. UNIT DESIGN:

Maintain irregular backline to meet visual objectives.

Northern boundary adjacent to landslide provides protection from windthrow.





# CRANE and ROWAN MOUNTAIN UNIT PLAN

**VCU-UNIT.ALT** 402-49.4

Management Prescription: Timber Production

Acres Even Aged: 10

Natural Stand Condition: Old Growth

Acres 2-Aged: 5

Desired Future Condition Even aged, 2-aged mixture

Acres Uneven Aged 0

Volume(MBF) 431

USGS 1/4 QUAD MAP #: PTA C2 NE

Aerial Photo: 77

Flight# 3A Photo#

8

## I. RESOURCE CONCERNS/OPPORTUNITIES - UNIT MANAGEMENT OBJECTIVES

Unit located near beach - maintain beach fringe habitat.

Estuary habitat south of unit - maintain wildlife habitat.

Unit is seen from saltwater - meet VQO of Modification.

Southerly winds predominate - incorporate disturbance ecology principles.

Wildlife Habitat - Maintain legacy structure in unit where possible for prey species habitat through alternative silvicultural prescription.

No streams in unit.

## II. IMPLEMENTATION ACTIVITIES

### A. ECOSYSTEMS MANAGEMENT:

#### 1. Vegetation:

Stand has no apparent cohorts. Average site.

#### 2. Aquatic Habitat:

No Class I/II streams in Unit.

No Class III streams in Unit.

#### 3. Wildlife Habitat:

Unit is in high deer HSI value and high Marten HIS value. South facing slope below 500 feet in elevation. Reserve trees will be retained in all alternatives that prescribe even-aged management. Retain multi-cohort stand structure and legacy to provide necessary habitat characteristics for forest dwelling species. Part of the unit will be harvested using alternative silvicultural prescriptions. This should exceed TLMP S&Gs.

#### 4. Visuals:

Unit is within the Rowan Peak viewshed and is part of a long range multi-entry harvest scheme designed to work with natural features found in the landscape. Unit meets partial retention VQO as designed.

### B. TRANSPORTATION SYSTEM:

The temporary spur continuing on from 402-28 ends at the landing for the northern cable setting (402-49b). The landing for this unit will also serve helicopter units 402-30,31,32 &50. All drainage structures will be removed from the temporary spur to restore natural drainage patterns. Additional waterbars will be added as needed, and all areas of exposed soil will be grass seeded.

### C. SILVICULTURAL PRESCRIPTION SUMMARY:

(a) is Clearcut with 15% retention of large wildlife legacy trees using downhill cable yarding system, certify natural regeneration, pre-commercial thin to maintain healthy stand. (b) is 2-aged Seedtree with reserves (upper and lower diameter limit Rx for hemlock and cedar, paint for reserve 2 large spruce every 10 acres) using uphill running skyline cable yarding system, certify natural regeneration, pre-commercial thin to maintain healthy stand. Initial managed stand will have 3 cohorts; 1) Young trees from regeneration harvest. 2) Small residuals left from lower dia. limit harvest 3) Large residual trees with high wildlife value. Over time, it is expected that a 2-aged stand will develop as large trees are removed through senescence and wind snap or by windthrow.

### D. UNIT DESIGN:

Maintain irregular backline to meet visual objectives.

Northern boundary adjacent to landslide provides protection from windthrow.



**VCU-UNIT.ALT** 402-49.5

Management Prescription: **Timber Production**

Natural Stand Condition: **Old Growth**

Desired Future Condition **Even aged**

Acres Even Aged: **15**

Acres 2-Aged: **0**

Acres Uneven Aged **0**

Volume(MBF) **504**

USGS 1/4 QUAD MAP #: **PTA C2 NE**

Aerial Photo: **77**

Flight# **3A**

Photo#

8

**I. RESOURCE CONCERNS/OPPORTUNITIES - UNIT MANAGEMENT OBJECTIVES**

- Unit located near beach - maintain beach fringe habitat.
- Estuary habitat south of unit - maintain wildlife habitat.
- Unit is seen from saltwater - meet VQO of Modification.
- Southerly winds predominate - incorporate disturbance ecology principles.
- No streams in unit.

**II. IMPLEMENTATION ACTIVITIES**

**A. ECOSYSTEMS MANAGEMENT:**

**1. Vegetation:**

Stand has no apparent cohorts. Average site.

**2. Aquatic Habitat:**

No Class I/II streams in Unit.

No Class III streams in Unit.

**3. Wildlife Habitat:**

Unit is in high deer HSI value and high Marten HIS value. South facing slope below 500 feet in elevation. Reserve trees will be retained in all alternatives that prescribe even-aged management.

**4. Visuals:**

Unit is within the Rowan Peak viewshed and is part of a long range multi-entry harvest scheme designed to work with natural features found in the landscape. Unit meets partial retention VQO as designed.

**B. TRANSPORTATION SYSTEM:**

The temporary spur continuing on from 402-28 ends at the landing for the northern cable setting (402-49b). The landing for this unit will also serve helicopter units 402-30,31,32 &50. All drainage structures will be removed from the temporary spur to restore natural drainage patterns. Additional waterbars will be added as needed, and all areas of exposed soil will be grass seeded.

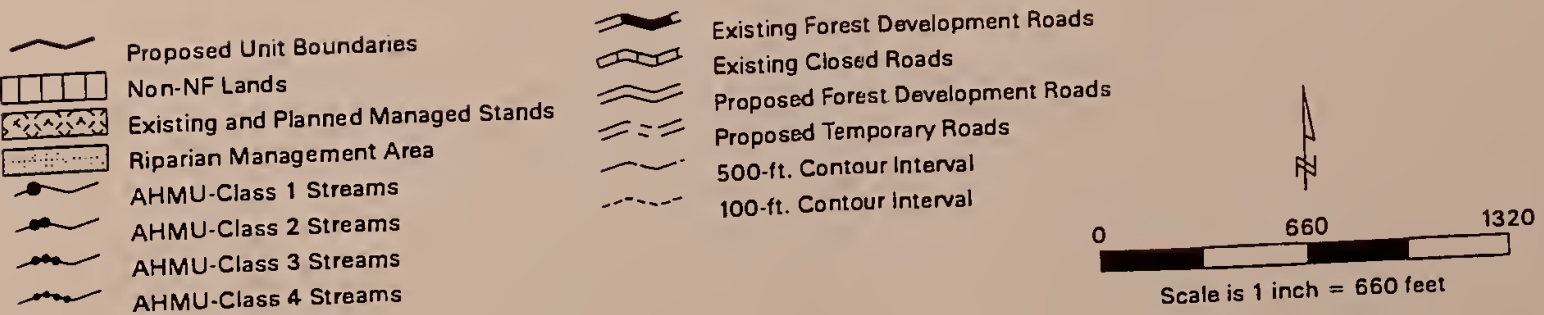
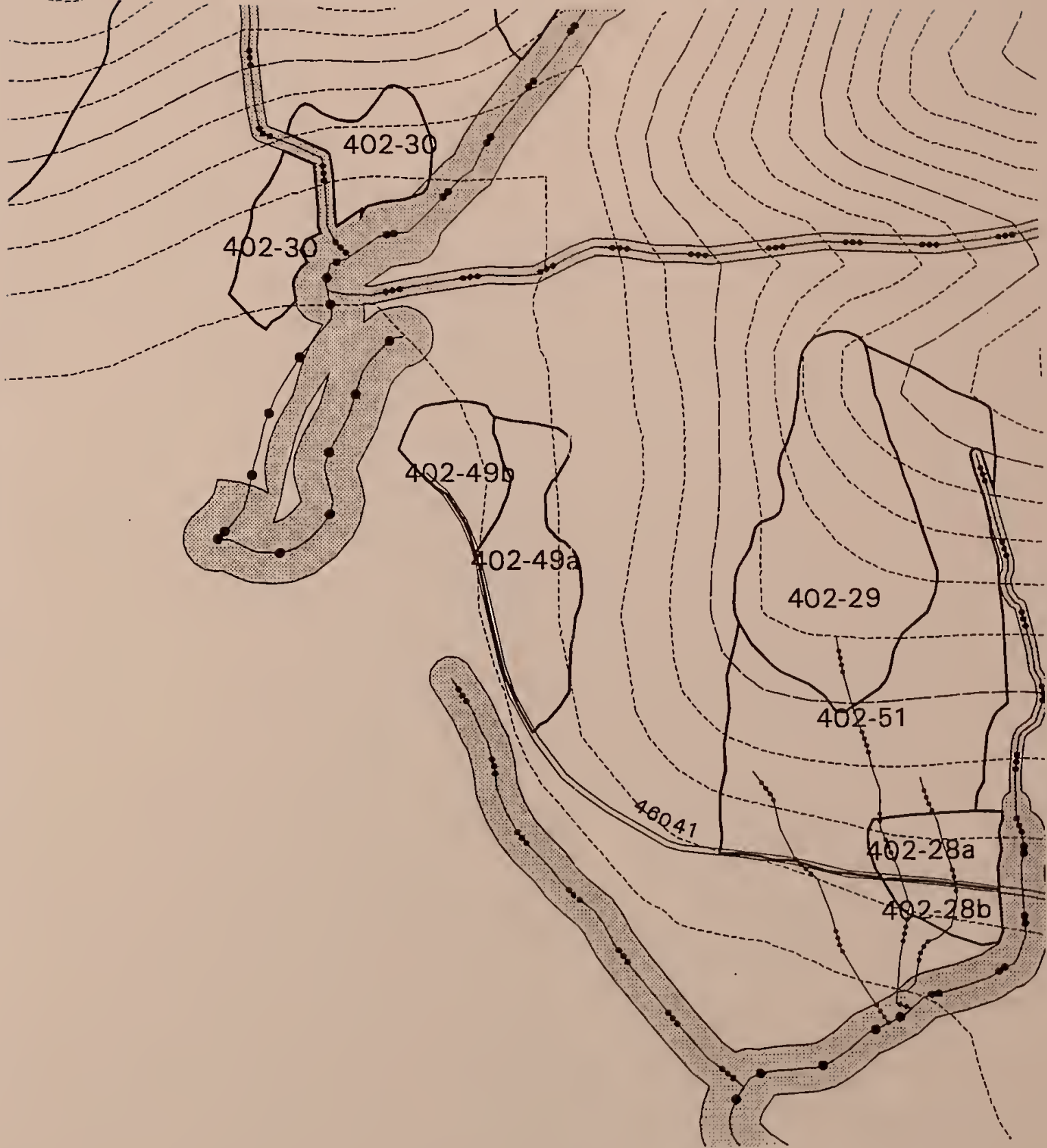
**C. SILVICULTURAL PRESCRIPTION SUMMARY:**

(a) is Evenaged Clearcut with 15% retention of large wildlife legacy trees using downhill cable yarding system, certify natural regeneration, pre-commercial thin to maintain healthy stand. (b) is same as (a) with uphill cable yarding.

**D. UNIT DESIGN:**

- Maintain irregular backline to meet visual objectives.
- Northern boundary adjacent to landslide provides protection from windthrow.

**Crane/Rowan Timber Harvest Unit 402-49**







## CRANE and ROWAN MOUNTAIN UNIT PLAN

**VCU-UNIT.ALT** 402-50.2

Management Prescription: Timber Production

Natural Stand Condition:

Desired Future Condition

Acres Even Aged: 0

Acres 2-Aged: 0

Acres Uneven Aged 0

Volume(MBF) 0

USGS 1/4 QUAD MAP #:

Aerial Photo: 0

Flight#

Photo#

0

### I. RESOURCE CONCERNS/OPPORTUNITIES - UNIT MANAGEMENT OBJECTIVES

Unit not in this alternative.

### II. IMPLEMENTATION ACTIVITIES

#### A. ECOSYSTEMS MANAGEMENT:

1. Vegetation:
2. Aquatic Habitat:

3. Wildlife Habitat:

4. Visuals:

#### B. TRANSPORTATION SYSTEM:

#### C. SILVICULTURAL PRESCRIPTION SUMMARY:

#### D. UNIT DESIGN:





## CRANE and ROWAN MOUNTAIN UNIT PLAN

**VCU-UNIT.ALT** 402-50.3

Management Prescription: Timber Production

Natural Stand Condition:

Desired Future Condition

Acres Even Aged: 0

Acres 2-Aged: 0

Acres Uneven Aged 0

Volume(MBF) 0

USGS 1/4 QUAD MAP #:

Aerial Photo: 0

Flight#

Photo#

0

### I. RESOURCE CONCERNS/OPPORTUNITIES - UNIT MANAGEMENT OBJECTIVES

Unit not in this alternative.

### II. IMPLEMENTATION ACTIVITIES

#### A. ECOSYSTEMS MANAGEMENT:

1. Vegetation:
2. Aquatic Habitat:

3. Wildlife Habitat:

4. Visuals:

#### B. TRANSPORTATION SYSTEM:

#### C. SILVICULTURAL PRESCRIPTION SUMMARY:

#### D. UNIT DESIGN:



## CRANE and ROWAN MOUNTAIN UNIT PLAN

**VCU-UNIT.ALT** 402-50.4

Management Prescription: Timber Production

Acres Even Aged: 0

Natural Stand Condition: Understory Reinitiation

Acres 2-Aged: 106

Desired Future Condition 2-aged

Acres Uneven Aged 0

Volume(MBF) 2014

USGS 1/4 QUAD MAP #:

Aerial Photo: 0

Flight#

Photo#

0

### I. RESOURCE CONCERNS/OPPORTUNITIES - UNIT MANAGEMENT OBJECTIVES

Wildlife Habitat - Maintain legacy structure in unit where possible for prey species habitat through alternative silvicultural prescription..

Two Class III streams in unit.

Unit is seen from saltwater - meet VQO of Modification.

### II. IMPLEMENTATION ACTIVITIES

#### A. ECOSYSTEMS MANAGEMENT:

##### 1. Vegetation:

Stand is understory reinitiation. Dense stand with good spruce component.

##### 2. Aquatic Habitat:

No Class I/II streams in Unit.

Class III: No programmed commercial timber harvest within the V-notch (side-slope break). Manage an appropriate distance beyond the slope break for windfirmness. (BMP 12.6 Riparian Area Designation and Protection; BMP 13.16 Stream Channel Protection) Both streams are in the High Gradient Contained Process Group. Manage the area with 120 feet of the top of the V-notch to provide for windfirmness. The 2-aged treatment is expected to meet the needs of providing windfirmness. South winds predominate.

##### 3. Wildlife Habitat:

Retain multi-cohort stand structure and legacy to provide necessary habitat characteristics for forest dwelling species. Unit will be harvested using alternative silvicultural prescriptions. This should exceed TLMP S&Gs.

##### 4. Visuals:

Unit is within the Rowan Peak viewshed and is part of a long range multi-entry harvest scheme designed to work with natural features found in the landscape. Unit meets partial retention VQO as designed.

#### B. TRANSPORTATION SYSTEM:

Unit is not accessible by road due to steep topography. Planned helicopter unit will use landing in 400-49.

#### C. SILVICULTURAL PRESCRIPTION SUMMARY:

Seed Tree with Reserves using helicopter yarding, use upper and lower diameter limit Rx for hemlock and cedar. Reserve and paint 2 large spruce every 10 acres. Initial managed stand will have 3 cohorts; 1) Young trees from regeneration harvest. 2) Small residuals left from lower dia. limit harvest 3) Large residual trees with high wildlife value. Over time, it is expected that a 2-aged stand will develop as large trees are removed through senescence and wind snap or by windthrow

#### D. UNIT DESIGN:





CRANE and ROWAN MOUNTAIN UNIT PLAN

**VCU-UNIT.ALT** 402-50.5

Management Prescription: Timber Production

Natural Stand Condition: Understory Reinitiation

Desired Future Condition 2-aged

Acres Even Aged: 0

Acres 2-Aged: 106

Acres Uneven Aged 0

Volume(MBF) 2014

Aerial Photo: 0

Flight#

Photo#

0

USGS 1/4 QUAD MAP #:

**I. RESOURCE CONCERNS/OPPORTUNITIES - UNIT MANAGEMENT OBJECTIVES**

Wildlife Habitat - Maintain legacy structure in unit where possible for prey species habitat through alternative silvicultural prescription.  
Two Class III streams in unit.  
Unit is seen from saltwater - meet VQO of Modification.

**II. IMPLEMENTATION ACTIVITIES**

**A. ECOSYSTEMS MANAGEMENT:**

**1. Vegetation:**

Stand is understory reinitiation. Dense stand with good spruce component.

**2. Aquatic Habitat:**

No Class I/II streams in Unit.

Class III: No programmed commercial timber harvest within the V-notch (side-slope break). Manage an appropriate distance beyond the slope break for windfirmness. (BMP 12.6 Riparian Area Designation and Protection; BMP 13.16 Stream Channel Protection) Both streams are in the High Gradient Contained Process Group. Manage the area with 120 feet of the top of the V-notch to provide for windfirmness. The 2-aged treatment is expected to meet the needs of providing windfirmness. South winds predominate.

**3. Wildlife Habitat:**

Retain multi-cohort stand structure and legacy to provide necessary habitat characteristics for forest dwelling species. Unit will be harvested using alternative silvicultural prescriptions. This should exceed TLMP S&Gs.

**4. Visuals:**

Unit is within the Rowan Peak viewshed and is part of a long range multi-entry harvest scheme designed to work with natural features found in the landscape. Unit meets partial retention VQO as designed.

**B. TRANSPORTATION SYSTEM:**

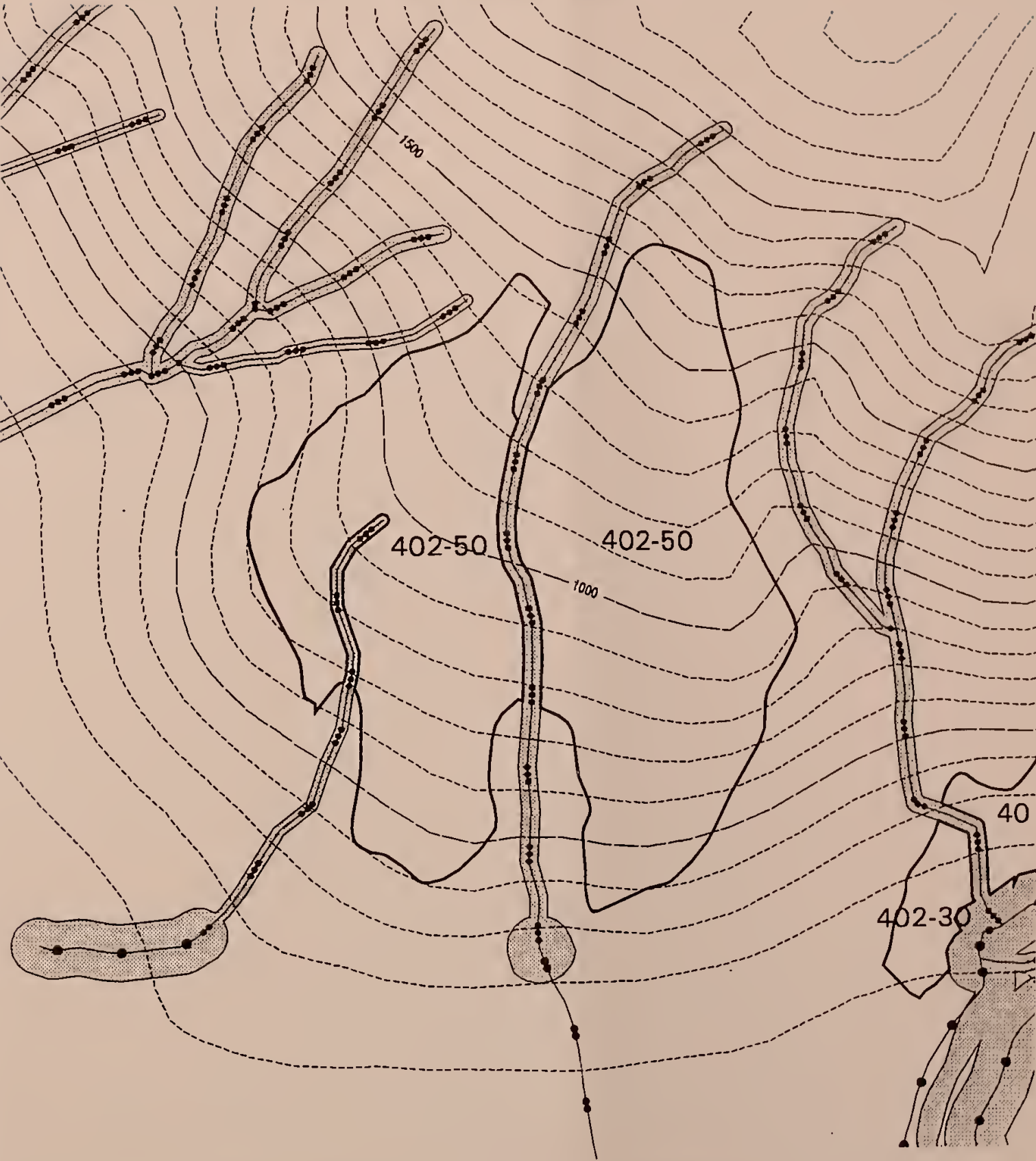
Unit is not accessible by road due to steep topography. Planned helicopter unit will use landing in 400-49.

**C. SILVICULTURAL PRESCRIPTION SUMMARY:**

Seed Tree with Reserves using helicopter yarding, use upper and lower diameter limit Rx for hemlock and cedar. Reserve and paint 2 large spruce every 10 acres. Initial managed stand will have 3 cohorts;1) Young trees from regeneration harvest. 2) Small residuals left from lower dia. limit harvest 3) Large residual trees with high wildlife value. Over time, it is expected that a 2-aged stand will develop as large trees are removed through senescence and wind snap or by windthrow

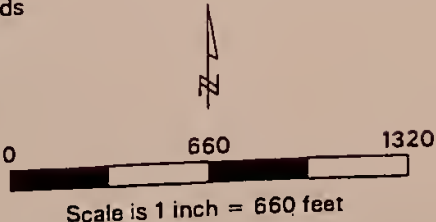
**D. UNIT DESIGN:**

Crane/Rowan Timber Harvest Unit 402-50



- Proposed Unit Boundaries
- Non-NF Lands
- Existing and Planned Managed Stands
- Riparian Management Area
- AHMU-Class 1 Streams
- AHMU-Class 2 Streams
- AHMU-Class 3 Streams
- AHMU-Class 4 Streams

- Existing Forest Development Roads
- Existing Closed Roads
- Proposed Forest Development Roads
- Proposed Temporary Roads
- 500-ft. Contour Interval
- 100-ft. Contour Interval





## CRANE and ROWAN MOUNTAIN UNIT PLAN

**VCU-UNIT.ALT** 402-51.2

Management Prescription: Timber Production

Acres Even Aged: 0

Natural Stand Condition: Understory Reinitiation

Acres 2-Aged: 0

Desired Future Condition

Acres Uneven Aged 0

Volume(MBF) 0

USGS 1/4 QUAD MAP #: PTA C1 NW

Aerial Photo: 77 Flight# 3A Photo# 8

### I. RESOURCE CONCERNS/OPPORTUNITIES - UNIT MANAGEMENT OBJECTIVES

Unit not in this alternative.

### II. IMPLEMENTATION ACTIVITIES

#### A. ECOSYSTEMS MANAGEMENT:

1. Vegetation:

2. Aquatic Habitat:

3. Wildlife Habitat:

4. Visuals:

#### B. TRANSPORTATION SYSTEM:

#### C. SILVICULTURAL PRESCRIPTION SUMMARY:

#### D. UNIT DESIGN:





## CRANE and ROWAN MOUNTAIN UNIT PLAN

**VCU-UNIT.ALT 402-51.3**

Management Prescription: Timber Production

Acres Even Aged: 0

Natural Stand Condition: Understory Reinitiation

Acres 2-Aged: 0

Desired Future Condition

Acres Uneven Aged 0

Volume(MBF) 0

USGS 1/4 QUAD MAP #: PTA C1 NW

Aerial Photo: 77

Flight#

3A

Photo#

8

### I. RESOURCE CONCERNS/OPPORTUNITIES - UNIT MANAGEMENT OBJECTIVES

Unit not in this alternative.

### II. IMPLEMENTATION ACTIVITIES

#### A. ECOSYSTEMS MANAGEMENT:

1. Vegetation:

2. Aquatic Habitat:

3. Wildlife Habitat:

4. Visuals:

#### B. TRANSPORTATION SYSTEM:

#### C. SILVICULTURAL PRESCRIPTION SUMMARY:

#### D. UNIT DESIGN:



# CRANE and ROWAN MOUNTAIN UNIT PLAN

**VCU-UNIT.ALT 402-51.4**

Management Prescription: **Timber Production**

Acres Even Aged: 0

Natural Stand Condition: **Understory Reinitiation**

Acres 2-Aged: 35

Desired Future Condition **2-aged**

Acres Uneven Aged 0

Volume(MBF) 665

USGS 1/4 QUAD MAP #: **PTA C1 NW**

Aerial Photo: 77

Flight# 3A

Photo#

8

## **I. RESOURCE CONCERNS/OPPORTUNITIES - UNIT MANAGEMENT OBJECTIVES**

Access "difficult" component of the ASQ - develop techniques for managing this component.

Unit is seen from Rowan Bay - meet VQO of Modification.

Southeast winds predominate - incorporate disturbance ecology principles.

Wildlife Habitat - Maintain legacy structure in unit where possible for prey species habitat through alternative silvicultural prescription.

Several Class IV streams extend up into unit.

## **II. IMPLEMENTATION ACTIVITIES**

### **A. ECOSYSTEMS MANAGEMENT:**

#### **1. Vegetation:**

Stand is understory reinitiation. Lower portion is multi-cohort, upper portion is 340 year old even aged dense stand with good spruce component. Small patch of 95 year old windthrow within stand. (from SE).

#### **2. Aquatic Habitat:**

No Class I/II streams in Unit.

No Class III streams in Unit.

Class IV: Provide adequate deflection to minimize soil disturbance by using tailtrees on ridge adjacent to the stream. Partially suspend logs over the stream. (BMP13.16 Stream Channel Protection)

#### **3. Wildlife Habitat:**

Retain multi-cohort stand structure and legacy to provide necessary habitat characteristics for forest dwelling species. Unit will be harvested using alternative silvicultural prescriptions. This should exceed TLMP S&Gs.

#### **4. Visuals:**

Unit is within the Rowan Peak viewshed and is part of a long range multi-entry harvest scheme designed to work with natural features found in the landscape. Unit meets partial retention VQO as designed.

### **B. TRANSPORTATION SYSTEM:**

Most of this unit is not accessible by road due to steep topography. The partial harvest prescription will be most easily accomplished by helicopter yarding. The temporary spur that runs along the bottom of this unit is available if the timber sale operator wants to try some downhill cable partial cutting. Planned helicopter unit will use landing in 402-28.

### **C. SILVICULTURAL PRESCRIPTION SUMMARY:**

Seed Tree with Reserves using helicopter yarding, use upper and lower diameter limit Rx for hemlock and cedar. Reserve and paint 2 large spruce every 10 acres. Initial managed stand will have 3 cohorts; 1) Young trees from regeneration harvest. 2) Small residuals left from lower dia. limit harvest 3) Large residual trees with high wildlife value. Over time, it is expected that a 2-aged stand will develop as large trees are removed through senescence and wind snap or by windthrow

### **D. UNIT DESIGN:**

Multi-entry plan for this hillside is to progressively harvest units into the wind.

Northwest boundary of unit located on leeward side of ridge to afford topographic protection from southeast winds.

Unit designed for helicopter yarding.





CRANE and ROWAN MOUNTAIN UNIT PLAN

VCU-UNIT.ALT

402-51.5

Management Prescription: Timber Production

Natural Stand Condition: Understory Reinitiation

Desired Future Condition 2-aged

Acres Even Aged: 0

Acres 2-Aged: 35

Acres Uneven Aged 0

Volume(MBF) 665

Aerial Photo: 77

Flight# 3A

Photo#

8

USGS 1/4 QUAD MAP #: PTA C1 NW

I. RESOURCE CONCERNS/OPPORTUNITIES - UNIT MANAGEMENT OBJECTIVES

- Access "difficult" component of the ASQ - develop techniques for managing this component.  
Unit is seen from Rowan Bay - meet VQO of Modification.  
Southeast winds predominate - incorporate disturbance ecology principles.  
Several Class IV streams extend up into unit.  
Wildlife Habitat - Maintain legacy structure in unit where possible for prey species habitat through alternative silvicultural prescription.

II. IMPLEMENTATION ACTIVITIES

A. ECOSYSTEMS MANAGEMENT:

1. Vegetation:  
Stand is understory reinitiation. Lower portion is multi-cohort, upper portion is 340 year old even aged dense stand with good spruce component. Small patch of 95 year old windthrow within stand. (from SE).
2. Aquatic Habitat:  
No Class I/II streams in Unit.  
No Class III streams in Unit.

- Class IV: Provide adequate deflection to minimize soil disturbance by using tailtrees on ridge adjacent to the stream. Partially suspend logs over the stream.( BMP13.16 Stream Channel Protection)
3. Wildlife Habitat:  
Retain multi-cohort stand structure and legacy to provide necessary habitat characteristics for forest dwelling species. Unit will be harvested using alternative silvicultural prescriptions. This should exceed TLMP S&Gs.

4. Visuals:  
Unit is within the Rowan Peak viewshed and is part of a long range multi-entry harvest scheme designed to work with natural features found in the landscape. Unit meets partial retention VQO as designed.

B. TRANSPORTATION SYSTEM:

Most of this unit is not accessible by road due to steep topography. The partial harvest prescription will be most easily accomplished by helicopter yarding. The temporary spur that runs along the bottom of this unit is available if the timber sale operator wants to try some downhill cable partial cutting. Planned helicopter unit will use landing in 402-28.

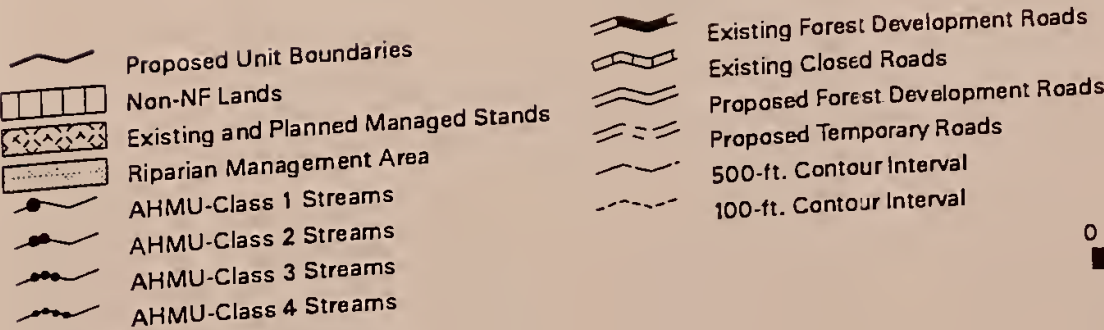
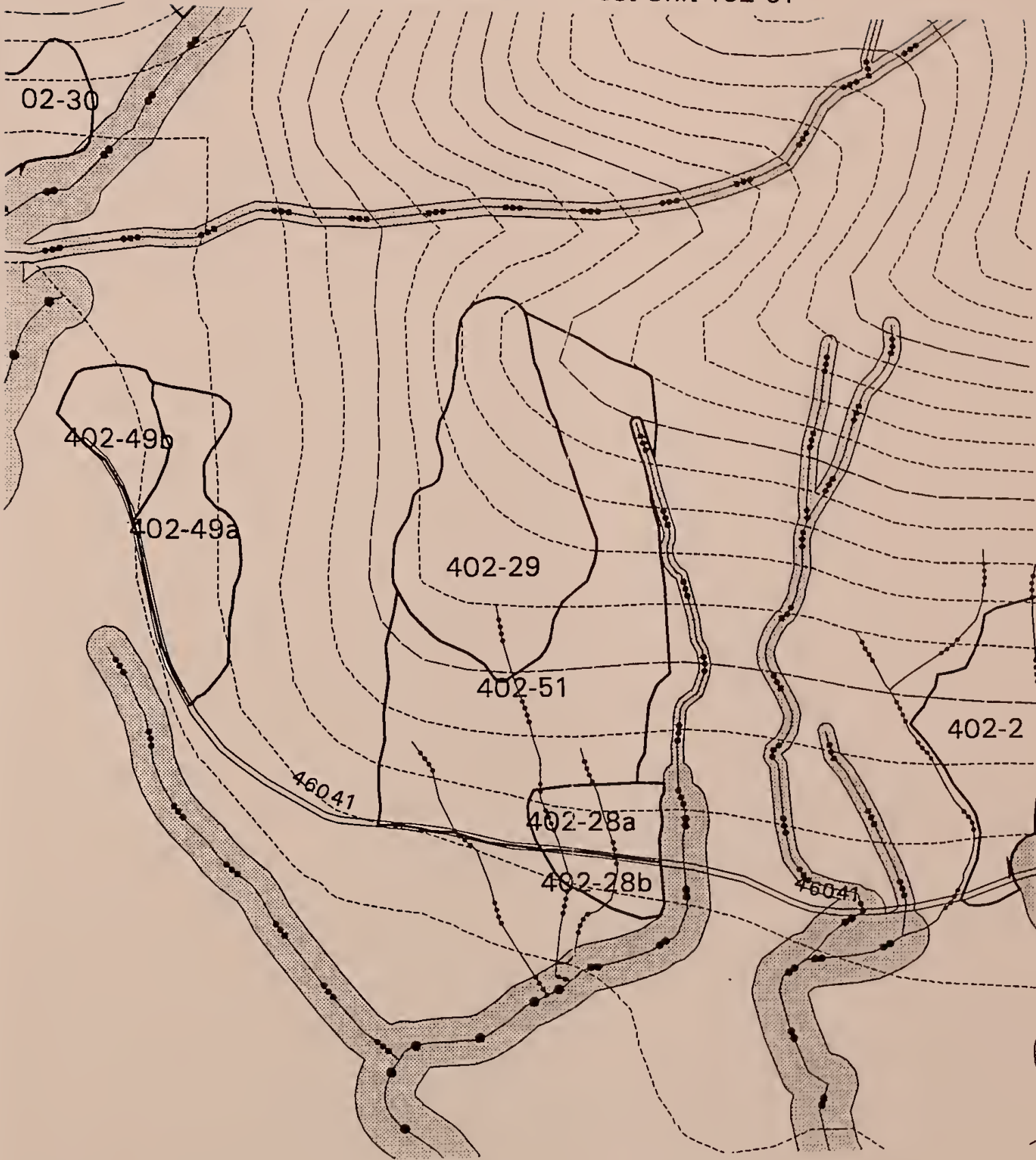
C. SILVICULTURAL PRESCRIPTION SUMMARY:

Seed Tree with Reserves using helicopter yarding, use upper and lower diameter limit Rx for hemlock and cedar. Reserve and paint 2 large spruce every 10 acres. Initial managed stand will have 3 cohorts;1) Young trees from regeneration harvest 2) Small residuals left from lower dia. limit harvest 3) Large residual trees with high wildlife value. Over time, it is expected that a 2-aged stand will develop as large trees are removed through senescence and wind snap or by windthrow

D. UNIT DESIGN:

Multi-entry plan for this hillside is to progressively harvest units into the wind.  
Northwest boundary of unit located on leeward side of ridge to afford topographic protection from southeast winds.  
Unit designed for helicopter yarding.

Crane/Rowan Timber Harvest Unit 402-51







# CRANE and ROWAN MOUNTAIN UNIT PLAN

**VCU-UNIT.ALT** 420-46.2

Management Prescription: Timber Production

Natural Stand Condition: Old Growth

Desired Future Condition Even aged

Acres Even Aged: 38

Acres 2-Aged: 0

Acres Uneven Aged 0

Volume(MBF) 1276.8

USGS 1/4 QUAD MAP #: PBG C6 NW

Aerial Photo: 77 Flight# 13 Photo# 51

## I. RESOURCE CONCERNS/OPPORTUNITIES - UNIT MANAGEMENT OBJECTIVES

Class III stream in unit.

Two Class IV streams in unit.

South winds predominate — incorporate disturbance ecology principles.

Area of incompetent, highly fractured, volcanoclastic rock in area — avoid these areas.

Area visible from Port Camden — meet modification VQO.

## II. IMPLEMENTATION ACTIVITIES

### A. ECOSYSTEMS MANAGEMENT:

#### 1. Vegetation:

Old Growth stand with no apparent cohort. Average site.

#### 2. Aquatic Habitat:

No Class I/II streams in Unit.

Class III: No programmed commercial timber harvest within the V-notch (side-slope break). Manage an appropriate distance beyond the slope break for windfirmness. (BMP 12.6 Riparian Area Designation and Protection; BMP 13.16 Stream Channel Protection) The Class III stream is in the High Gradient Contained Process Group. Manage the area within 120 feet of the V-notch to provide for windfirmness. Pay special attention to the south side of the stream which will be exposed to SE winds.

Class IV: Provide adequate deflection to minimize soil disturbance by using tailtrees on ridge adjacent to the stream.

Partially suspend logs over the stream. (BMP 13.16 Stream Channel Protection)

#### 3. Wildlife Habitat:

Unit is in medium deer HSI value and high Marten HIS value. South facing slope below 1000 feet in elevation.

#### 4. Visuals:

Landscape viewed in the middle-ground from Port Camden. Past harvest activities are evident, yet work with features found in the characteristic landscape. Unit falls within the west Port Camden viewshed, future activities are designed to be consistent with the existing harvest patterns. Unit meets modification VQO as designed.

### B. TRANSPORTATION SYSTEM:

Specified road 46360 runs through this unit. This road will be put into "storage" after harvest is complete. All drainage structures will be removed to restore natural drainage patterns. Additional waterbars will be added as needed, and all areas of exposed soil will be grass seeded.

### C. SILVICULTURAL PRESCRIPTION SUMMARY:

Evenage Clearcut using cable yarding system, certify natural regeneration, pre-commercial thin to maintain healthy stand.

### D. UNIT DESIGN:

Unit avoids area of highly fractured bedrock. Partial suspension is required for soils protection. Upper backline is on steeper slopes where timber has developed a natural windfirmness due to topographic relation to the prevailing winds. Irregular boundaries and relationship to topographic features will ensure meeting the visual objectives.





## CRANE and ROWAN MOUNTAIN UNIT PLAN

**VCU-UNIT.ALT** 420-46.3

Management Prescription: Timber Production

Acres Even Aged: 0

Natural Stand Condition: Old Growth

Acres 2-Aged: 38

Desired Future Condition 2-aged

Acres Uneven Aged 0

Volume(MBF) 722

USGS 1/4 QUAD MAP #: PBG C6 NW

Aerial Photo: 77

Flight# 13

Photo#

51

### I. RESOURCE CONCERNS/OPPORTUNITIES - UNIT MANAGEMENT OBJECTIVES

Class III stream in unit.

Two Class IV streams in unit.

South winds predominate -- incorporate disturbance ecology principles.

Area of incompetent, highly fractured, volcanoclastic rock in area -- avoid these areas.

Area visible from Port Camden -- meet modification VQO.

Wildlife Habitat - Maintain legacy structure in unit where possible for prey species habitat through alternative silvicultural prescription.

### II. IMPLEMENTATION ACTIVITIES

#### **A. ECOSYSTEMS MANAGEMENT:**

##### **1. Vegetation:**

Stand is average site with no apparent cohorts.

##### **2. Aquatic Habitat:**

No Class I/II streams in Unit.

Class III: No programmed commercial timber harvest within the V-notch (side-slope break). Manage an appropriate distance beyond the slope break for windfirmness. (BMP 12.6 Riparian Area Designation and Protection; BMP 13.16 Stream Channel Protection) The Class III stream is in the High Gradient Contained Process Group. Manage the area within 120 feet of the V-notch to provide for windfirmness. Pay special attention to the south side of the stream which will be exposed to SE winds.

Class IV: Provide adequate deflection to minimize soil disturbance by using tailtrees on ridge adjacent to the stream. Partially suspend logs over the stream. (BMP 13.16 Stream Channel Protection)

##### **3. Wildlife Habitat:**

Retain multi-cohort stand structure to provide necessary habitat characteristics for forest dwelling species. Entire unit will be harvested using an alternative silvicultural prescription (See below). This should exceed the TLMP Standards and Guidelines for the entire the unit.

##### **4. Visuals:**

Landscape viewed in the middle-ground from Port Camden. Past harvest activities are evident, yet work with features found in the characteristic landscape. Unit falls within the west Port Camden viewshed, future activities are designed to be consistent with the existing harvest patterns. Unit meets partial retention VQO as designed.

#### **B. TRANSPORTATION SYSTEM:**

Specified road 46360 runs through this unit. This road will be put into "storage" after harvest is complete. All drainage structures will be removed to restore natural drainage patterns. Additional waterbars will be added as needed, and all areas of exposed soil will be grass seeded.

#### **C. SILVICULTURAL PRESCRIPTION SUMMARY:**

Seed Tree with Reserves using cable yarding, use upper and lower diameter limit Rx for hemlock and cedar. Reserve and paint 2 large spruce every 10 acres. Initial managed stand will have 3 cohorts; 1) Young trees from regeneration harvest. 2) Small residuals left from lower dia. limit harvest 3) Large residual trees with high wildlife value. Over time, it is expected that a 2-aged stand will develop as large trees are removed through senescence and wind snap or by windthrow.

#### **D. UNIT DESIGN:**

Unit avoids area of highly fractured bedrock. Partial suspension is required for soils protection. Upper backline is on steeper slopes where timber has developed a natural windfirmness due to topographic relation to the prevailing winds. Irregular boundaries and relationship to topographic features will ensure meeting the visual objectives.



# CRANE and ROWAN MOUNTAIN UNIT PLAN

**VCU-UNIT.ALT** 420-46.4

Management Prescription: Timber Production

Natural Stand Condition: Old Growth

Desired Future Condition 2-aged

Acres Even Aged: 0

Acres 2-Aged: 38

Acres Uneven Aged 0

Volume(MBF) 722

USGS 1/4 QUAD MAP #: PBG C6 NW

Aerial Photo: 77

Flight# 13

Photo#

51

## I. RESOURCE CONCERNS/OPPORTUNITIES - UNIT MANAGEMENT OBJECTIVES

Class III stream in unit.

Two Class IV streams in unit.

South winds predominate – incorporate disturbance ecology principles.

Area of incompetent, highly fractured, volcanoclastic rock in area – avoid these areas.

Area visible from Port Camden – meet modification VQO.

Wildlife Habitat - Maintain legacy structure in unit where possible for prey species habitat through alternative silvicultural prescription.

## II. IMPLEMENTATION ACTIVITIES

### A. ECOSYSTEMS MANAGEMENT:

#### 1. Vegetation:

Stand is average site with no apparent cohorts.

#### 2. Aquatic Habitat:

No Class I/II streams in Unit.

Class III: No programmed commercial timber harvest within the V-notch (side-slope break). Manage an appropriate distance beyond the slope break for windfirmness. (BMP 12.6 Riparian Area Designation and Protection; BMP 13.16 Stream Channel Protection) The Class III stream is in the High Gradient Contained Process Group. Manage the area within 120 feet of the V-notch to provide for windfirmness. Pay special attention to the south side of the stream which will be exposed to SE winds.

Class IV: Provide adequate deflection to minimize soil disturbance by using tailtrees on ridge adjacent to the stream. Partially suspend logs over the stream.( BMP13.16 Stream Channel Protection)

#### 3. Wildlife Habitat:

Retain multi-cohort stand structure to provide necessary habitat characteristics for forest dwelling species. Entire unit will be harvested using an alternative silvicultural prescription (See below). This should exceed the TLMP Standards and Guidelines for the entire the unit.

#### 4. Visuals:

Landscape viewed in the middle-ground from Port Camden. Past harvest activities are evident, yet work with features found in the characteristic landscape. Unit falls within the west Port Camden viewshed, future activities are designed to be consistent with the existing harvest patterns. Unit meets partial retention VQO as designed.

### B. TRANSPORTATION SYSTEM:

Specified road 46360 runs through this unit. This road will be put into "storage" after harvest is complete. All drainage structures will be removed to restore natural drainage patterns. Additional waterbars will be added as needed, and all areas of exposed soil will be grass seeded.

### C. SILVICULTURAL PRESCRIPTION SUMMARY:

Seed Tree with Reserves using cable yarding, use upper and lower diameter limit Rx for hemlock and cedar. Reserve and paint 2 large spruce every 10 acres. Initial managed stand will have 3 cohorts; 1) Young trees from regeneration harvest. 2) Small residuals left from lower dia. limit harvest 3) Large residual trees with high wildlife value. Over time, it is expected that a 2-aged stand will develop as large trees are removed through senescence and wind snap or by windthrow.

### D. UNIT DESIGN:

Unit avoids area of highly fractured bedrock. Partial suspension is required for soils protection. Upper backline is on steeper slopes where timber has developed a natural windfirmness due to topographic relation to the prevailing winds. Irregular boundaries and relationship to topographic features will ensure meeting the visual objectives.





CRANE and ROWAN MOUNTAIN UNIT PLAN

**VCU-UNIT.ALT** 420-46.5

Management Prescription: Timber Production

Natural Stand Condition: Old Growth

Desired Future Condition Even aged

Acres Even Aged: 38

Acres 2-Aged: 0

Acres Uneven Aged 0

Volume(MBF) 1276.8

USGS 1/4 QUAD MAP #: PBG C6 NW

Aerial Photo: 77

Flight# 13

Photo# 51

**I. RESOURCE CONCERNS/OPPORTUNITIES - UNIT MANAGEMENT OBJECTIVES**

- Class III stream in unit.
- Two Class IV streams in unit.
- South winds predominate – incorporate disturbance ecology principles.
- Area of incompetent, highly fractured, volcanoclastic rock in area – avoid these areas.
- Area visible from Port Camden – meet modification VQO.

**II. IMPLEMENTATION ACTIVITIES**

**A. ECOSYSTEMS MANAGEMENT:**

**1. Vegetation:**

Old Growth stand with no apparent cohort. Average site.

**2. Aquatic Habitat:**

No Class I/II streams in Unit.

Class III: No programmed commercial timber harvest within the V-notch (side-slope break). Manage an appropriate distance beyond the slope break for windfirmness. (BMP 12.6 Riparian Area Designation and Protection; BMP 13.16 Stream Channel Protection) The Class III stream is in the High Gradient Contained Process Group. Manage the area within 120 feet of the V-notch to provide for windfirmness. Pay special attention to the south side of the stream which will be exposed to SE winds.

Class IV: Provide adequate deflection to minimize soil disturbance by using tailtrees on ridge adjacent to the stream. Partially suspend logs over the stream.( BMP13.16 Stream Channel Protection)

**3. Wildlife Habitat:**

Unit is in medium deer HSI value and high Marten HIS value. South facing slope below 1000 feet in elevation.

**4. Visuals:**

Landscape viewed in the middle-ground from Port Camden. Past harvest activities are evident, yet work with features found in the characteristic landscape. Unit falls within the west Port Camden viewshed, future activities are designed to be consistent with the existing harvest patterns. Unit meets modification VQO as designed.

**B. TRANSPORTATION SYSTEM:**

Specified road 46360 runs through this unit. This road will be put into "storage" after harvest is complete. All drainage structures will be removed to restore natural drainage patterns. Additional waterbars will be added as needed, and all areas of exposed soil will be grass seeded.

**C. SILVICULTURAL PRESCRIPTION SUMMARY:**

Evenage Clearcut using cable yarding system, certify natural regeneration, pre-commercial thin to maintain healthy stand.

**D. UNIT DESIGN:**

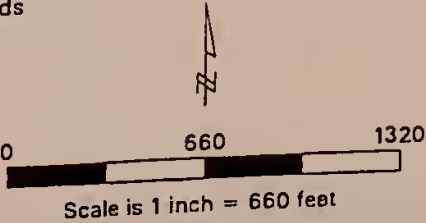
Unit avoids area of highly fractured bedrock. Partial suspension is required for soils protection. Upper backline is on steeper slopes where timber has developed a natural windfirmness due to topographic relation to the prevailing winds. Irregular boundaries and relationship to topographic features will ensure meeting the visual objectives.

Crane/Rowan Timber Harvest Unit 420-46



- Proposed Unit Boundaries
- Non-NF Lands
- Existing and Planned Managed Stands
- Riparian Management Area
- AHMU-Class 1 Streams
- AHMU-Class 2 Streams
- AHMU-Class 3 Streams
- AHMU-Class 4 Streams

- Existing Forest Development Roads
- Existing Closed Roads
- Proposed Forest Development Roads
- Proposed Temporary Roads
- 500-ft. Contour Interval
- 100-ft. Contour Interval



The first part of the paper discusses the importance of understanding the underlying mechanisms of the observed phenomena. This involves a detailed analysis of the data and the theoretical framework. The second part of the paper presents the results of the analysis, which show that the observed phenomena can be explained by the proposed model. The third part of the paper discusses the implications of the results and the need for further research.

The results of the analysis show that the observed phenomena can be explained by the proposed model. This is supported by the data and the theoretical framework. The implications of the results are discussed, and the need for further research is emphasized. The paper concludes with a summary of the findings and a list of references.

The paper concludes with a summary of the findings and a list of references. The findings show that the observed phenomena can be explained by the proposed model. The references are listed at the end of the paper.

# CRANE and ROWAN MOUNTAIN UNIT PLAN

**VCU-UNIT.ALT** 420-47.2

Management Prescription: Timber Production

Acres Even Aged: 27

Natural Stand Condition: Understory Reinitiation

Acres 2-Aged: 0

Desired Future Condition Even aged

Acres Uneven Aged 0

Volume(MBF) 907.2

USGS 1/4 QUAD MAP #: PBG C6 NW

Aerial Photo: 77

Flight# 13

Photo#

51

## I. RESOURCE CONCERNS/OPPORTUNITIES - UNIT MANAGEMENT OBJECTIVES

South winds predominate -- incorporate disturbance ecology principles.

Area of incompetent, highly fractured, volcanoclastic rock in area -- avoid these areas.

Unit is seen from saltwater -- meet VQO of modification.

No streams in unit.

## II. IMPLEMENTATION ACTIVITIES

### A. ECOSYSTEMS MANAGEMENT:

#### 1. Vegetation:

Stand is multi cohort with area of early understory reinitiation (160 years) with scattered large residuals.

#### 2. Aquatic Habitat:

No Class I/II streams in Unit.

No Class III streams in Unit.

#### 3. Wildlife Habitat:

Unit is in medium deer HSI value and high Marten HIS value. South facing slope below 800 feet in elevation.

#### 4. Visuals:

Landscape viewed in the middle-ground from Port Camden. Past harvest activities are evident, yet work with features found in the characteristic landscape. Unit falls within the west Port Camden viewshed, future activities are designed to be consistent with the existing harvest patterns. Unit meets modification VQO as designed.

### B. TRANSPORTATION SYSTEM:

Specified road 46360 runs along the top of the unit. A temporary spur runs down to the edge of a bench overlooking the lower portion of the unit. The spur will be obliterated and the specified road put into "storage" after harvest is complete. All drainage structures will be removed to restore natural drainage patterns. Additional waterbars will be added as needed, and all areas of exposed soil will be grass seeded.

### C. SILVICULTURAL PRESCRIPTION SUMMARY:

Evenage Clearcut using cable yarding system, certify natural regeneration, pre-commercial thin to maintain healthy stand.

### D. UNIT DESIGN:

Unit avoids are of highly fractured bedrock. Partial suspension is required in unit to protect soils. Upper backline is on steeper slopes where timber has developed a natural windfirmness due to topographic relation to the prevailing winds. Northern boundary takes advantage of muskeg to minimize risk of blowdown. Unit shaped to minimize apparent size and work with topographic features found in the landscape.





# CRANE and ROWAN MOUNTAIN UNIT PLAN

**VCU-UNIT.ALT** 420-47.3

Management Prescription: Timber Production

Acres Even Aged: 0

Natural Stand Condition: Understory Reinitiation

Acres 2-Aged: 27

Desired Future Condition 2-aged

Acres Uneven Aged 0

Volume(MBF) 513

USGS 1/4 QUAD MAP #: PBG C6 NW

Aerial Photo: 77

Flight# 13

Photo#

51

## I. RESOURCE CONCERNS/OPPORTUNITIES - UNIT MANAGEMENT OBJECTIVES

South winds predominate -- incorporate disturbance ecology principles.

Area of incompetent, highly fractured, volcanoclastic rock in area -- avoid these areas.

Unit is seen from saltwater -- meet VQO of modification.

Wildlife Habitat - Maintain legacy structure in unit where possible for prey species habitat through alternative silvicultural prescription.

No streams in unit.

## II. IMPLEMENTATION ACTIVITIES

### A. ECOSYSTEMS MANAGEMENT:

#### 1. Vegetation:

Stand is multi cohort with area of early understory reinitiation (160 years) with scattered large residuals.

#### 2. Aquatic Habitat:

No Class I/II streams in Unit.

No Class III streams in Unit.

#### 3. Wildlife Habitat:

Retain multi-cohort stand structure to provide necessary habitat characteristics for forest dwelling species. Entire unit will be harvested using an alternative silvicultural prescription (See below). This should exceed the TLMP Standards and Guidelines for the entire the unit.

#### 4. Visuals:

Landscape viewed in the middle-ground from Port Camden. Past harvest activities are evident, yet work with features found in the characteristic landscape. Unit falls within the west Port Camden viewshed, future activities are designed to be consistent with the existing harvest patterns. Unit meets partial retention VQO as designed.

### B. TRANSPORTATION SYSTEM:

Specified road 46360 runs along the top of the unit. A temporary spur runs down to the edge of a bench overlooking the lower portion of the unit. The spur will be obliterated and the specified road put into "storage" after harvest is complete. All drainage structures will be removed to restore natural drainage patterns. Additional waterbars will be added as needed, and all areas of exposed soil will be grass seeded.

### C. SILVICULTURAL PRESCRIPTION SUMMARY:

Seed Tree with Reserves using cable yarding, use upper and lower diameter limit Rx for hemlock and cedar. Reserve and paint 2 large spruce every 10 acres. Initial managed stand will have 3 cohorts; 1) Young trees from regeneration harvest. 2) Small residuals left from lower dia. limit harvest 3) Large residual trees with high wildlife value. Over time, it is expected that a 2-aged stand will develop as large trees are removed through senescence and wind snap or by windthrow.

### D. UNIT DESIGN:

Unit avoids are of highly fractured bedrock. Partial suspension is required in unit to protect soils. Upper backline is on steeper slopes where timber has developed a natural windfirmness due to topographic relation to the prevailing winds. Northern boundary takes advantage of muskeg to minimize risk of blowdown. Unit shaped to minimize apparent size and work with topographic features found in the landscape.



## CRANE and ROWAN MOUNTAIN UNIT PLAN

**VCU-UNIT.ALT** 420-47.4

Management Prescription: Timber Production

Acres Even Aged: 0

Natural Stand Condition: Understory Reinitiation

Acres 2-Aged: 27

Desired Future Condition 2-aged

Acres Uneven Aged 0

Volume(MBF) 513

USGS 1/4 QUAD MAP #: PBG C6 NW

Aerial Photo: 77

Flight# 13

Photo#

51

### I. RESOURCE CONCERNS/OPPORTUNITIES - UNIT MANAGEMENT OBJECTIVES

South winds predominate -- incorporate disturbance ecology principles.

Area of incompetent, highly fractured, volcanoclastic rock in area -- avoid these areas.

Unit is seen from saltwater -- meet VQO of modification.

Wildlife Habitat - Maintain legacy structure in unit where possible for prey species habitat through alternative silvicultural prescription.

No streams in unit.

### II. IMPLEMENTATION ACTIVITIES

#### A. ECOSYSTEMS MANAGEMENT:

##### 1. Vegetation:

Stand is multi cohort with area of early understory reinitiation (160 years) with scattered large residuals.

##### 2. Aquatic Habitat:

No Class I/II streams in Unit.

No Class III streams in Unit.

##### 3. Wildlife Habitat:

Retain multi-cohort stand structure to provide necessary habitat characteristics for forest dwelling species. Entire unit will be harvested using an alternative silvicultural prescription (See below). This should exceed the TLMP Standards and Guidelines for the entire the unit.

##### 4. Visuals:

Landscape viewed in the middle-ground from Port Camden. Past harvest activities are evident, yet work with features found in the characteristic landscape. Unit falls within the west Port Camden viewshed, future activities are designed to be consistent with the existing harvest patterns Unit meets partial retention VQO as designed..

#### B. TRANSPORTATION SYSTEM:

Specified road 46360 runs along the top of the unit. A temporary spur runs down to the edge of a bench overlooking the lower portion of the unit. The spur will be obliterated and the specified road put into "storage" after harvest is complete. All drainage structures will be removed to restore natural drainage patterns. Additional waterbars will be added as needed, and all areas of exposed soil will be grass seeded.

#### C. SILVICULTURAL PRESCRIPTION SUMMARY:

Seed Tree with Reserves using cable yarding, use upper and lower diameter limit Rx for hemlock and cedar. Reserve and paint 2 large spruce every 10 acres. Initial managed stand will have 3 cohorts; 1) Young trees from regeneration harvest. 2) Small residuals left from lower dia. limit harvest 3) Large residual trees with high wildlife value. Over time, it is expected that a 2-aged stand will develop as large trees are removed through senescence and wind snap or by windthrow.

#### D. UNIT DESIGN:

Unit avoids are of highly fractured bedrock. Partial suspension is required in unit to protect soils. Upper backline is on steeper slopes where timber has developed a natural windfirmness due to topographic relation to the prevailing winds. Northern boundary takes advantage of muskeg to minimize risk of blowdown. Unit shaped to minimize apparent size and work with topographic features found in the landscape.





CRANE and ROWAN MOUNTAIN UNIT PLAN

VCU-UNIT.ALT 420-47.5		Acres Even Aged: 27	
Management Prescription: Timber Production		Acres 2-Aged: 0	
Natural Stand Condition: Understory Reinitiation		Acres Uneven Aged 0	
Desired Future Condition Even aged		Volume(MBF) 907.2	
USGS 1/4 QUAD MAP #: PBG C6 NW		Aerial Photo: 77	Flight# 13 Photo# 51

I. RESOURCE CONCERNS/OPPORTUNITIES - UNIT MANAGEMENT OBJECTIVES

South winds predominate -- incorporate disturbance ecology principles.  
Area of incompetent, highly fractured, volcaniclastic rock in area -- avoid these areas.  
Unit is seen from saltwater -- meet VQO of modification.  
No streams in unit.

II. IMPLEMENTATION ACTIVITIES

A. ECOSYSTEMS MANAGEMENT:

1. Vegetation:  
Stand is multi cohort with area of early understory reinitiaition (160 years) with scattered large residuals.
2. Aquatic Habitat:  
No Class I/II streams in Unit.  
No Class III streams in Unit.

3. Wildlife Habitat:  
Unit is in medium deer HSI value and high Marten HIS value. South facing slope below 800 feet in elevation.
4. Visuals:  
Landscape viewed in the middle-ground from Port Camden. Past harvest activities are evident, yet work with features found in the characteristic landscape. Unit falls within the west Port Camden viewshed, future activities are designed to be consistent with the existing harvest patterns. Unit meets modification VQO as designed.

B. TRANSPORTATION SYSTEM:

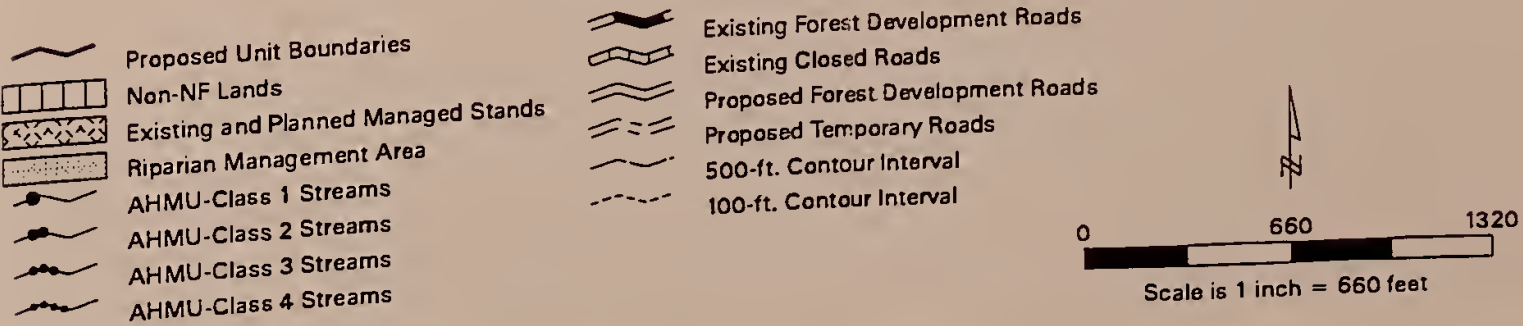
Specified road 46360 runs along the top of the unit. A temporary spur runs down to the edge of a bench overlooking the lower portion of the unit. The spur will be obliterated and the specified road put into "storage" after harvest is complete. All drainage structures will be removed to restore natural drainage patterns. Additional waterbars will be added as needed, and all areas of exposed soil will be grass seeded.

C. SILVICULTURAL PRESCRIPTION SUMMARY:

Evenage Clearcut using cable yarding system, certify natural regeneration, pre-commercial thin to maintain healthy stand.

D. UNIT DESIGN:

Unit avoids are of highly fractured bedrock. Partial suspension is required in unit to protect soils. Upper backline is on steeper slopes where timber has developed a natural windfirmness due to topographic relation to the prevailing winds. Northern boundary takes advantage of muskeg to minimize risk of blowdown. Unit shaped to minimize apparent size and work with topographic features found in the landscape.





# CRANE and ROWAN MOUNTAIN UNIT PLAN

**VCU-UNIT.ALT 420-48.2**

Management Prescription: Timber Production

Acres Even Aged: 42

Natural Stand Condition: Old Growth/Understory Reinitiation

Acres 2-Aged: 0

Desired Future Condition Even aged

Acres Uneven Aged 0

Volume(MBF) 1411.2

USGS 1/4 QUAD MAP #: PBG D6 SW

Aerial Photo: 77

Flight# 13

Photo#

51

## **I. RESOURCE CONCERNS/OPPORTUNITIES - UNIT MANAGEMENT OBJECTIVES**

Class III stream north of unit -- maintain stream channel stability.  
Southerly winds predominate -- incorporate disturbance ecology principles.  
Unit is seen from saltwater -- meet modification VQO.

## **II. IMPLEMENTATION ACTIVITIES**

### **A. ECOSYSTEMS MANAGEMENT:**

#### **1. Vegetation:**

Stand appears to be oldgrowth with patches of windthrow of 160 year cohort.

#### **2. Aquatic Habitat:**

No Class I/II streams in Unit.

Class III: No programmed commercial timber harvest within the V-notch (side-slope break). Manage an appropriate distance beyond the slope break for windfirmness. (BMP 12.6 Riparian Area Designation and Protection; BMP 13.16 Stream Channel Protection) Stream to the north is in the High Gradient Contained Process Group. Manage the area within 120 feet from the top of the V-notch to provide for windfirmness by feathering the unit boundary. The deep V-notch will provide topographic protection for the no-cut buffer. Southeast winds predominate.

#### **3. Wildlife Habitat:**

Unit is in medium deer HSI value and high Marten HIS value. South facing slope below 700 feet in elevation.

#### **4. Visuals:**

Landscape viewed in the middle-ground from Port Camden. Past harvest activities are evident, yet work with features found in the characteristic landscape. Unit falls within the west Port Camden viewshed, future activities are designed to be consistent with the existing harvest patterns. Unit meets modification VQO as designed.

### **B. TRANSPORTATION SYSTEM:**

Specified road 46360 runs to the last landing (the north setting). It will continue past this unit in the future. A short temporary spur is needed for the eastern setting. The spur will be obliterated and the specified road put into "storage" after harvest is complete. All drainage structures will be removed to restore natural drainage patterns. Additional waterbars will be added as needed, and all areas of exposed soil will be grass seeded.

### **C. SILVICULTURAL PRESCRIPTION SUMMARY:**

(a) Clearcut for natural regeneration, use downhill cable yarding, manage as even-aged stand, certify regeneration, pre-commercial thin to increase diameter growth and to provide light for shrubs and forbs. (b) is same as (a) with uphill cable yarding system.

### **D. UNIT DESIGN:**

Northern boundary is located over the slope break of the Class III stream to protect buffer from wind, but still avoids the steepest area of the streambank. Lower boundary is intentionally irregular to meet visual objectives.





# CRANE and ROWAN MOUNTAIN UNIT PLAN

**VCU-UNIT.ALT** 420-48.3

Management Prescription: Timber Production

Acres Even Aged: 8

Natural Stand Condition: Old Growth/Understory Reinitiation

Acres 2-Aged: 34

Desired Future Condition Even aged, 2-aged mixture

Acres Uneven Aged 0

Volume(MBF) 914.8

USGS 1/4 QUAD MAP #: PBG D6 SW

Aerial Photo: 77

Flight# 13

Photo#

51

## I. RESOURCE CONCERNS/OPPORTUNITIES - UNIT MANAGEMENT OBJECTIVES

Class III stream north of unit – maintain stream channel stability.

Southerly winds predominate – incorporate disturbance ecology principles.

Unit is seen from saltwater – meet modification VQO.

Wildlife Habitat - Maintain legacy structure in unit where possible for prey species habitat through alternative silvicultural prescription.

## II. IMPLEMENTATION ACTIVITIES

### A. ECOSYSTEMS MANAGEMENT:

#### 1. Vegetation:

Stand appears to be oldgrowth with patches of windthrow of 160 year cohort.

#### 2. Aquatic Habitat:

No Class I/II streams in Unit.

Class III: No programmed commercial timber harvest within the V-notch (side-slope break). Manage an appropriate distance beyond the slope break for windfirmness. (BMP 12.6 Riparian Area Designation and Protection; BMP 13.16 Stream Channel Protection) Stream to the north is in the High Gradient Contained Process Group. Manage the area within 120 feet from the top of the V-notch to provide for windfirmness by feathering the unit boundary. The deep V-notch will provide topographic protection for the no-cut buffer. Southeast winds predominate.

#### 3. Wildlife Habitat:

Retain multi-cohort stand structure to provide necessary habitat characteristics for forest dwelling species. Lower portion of the unit will be harvested using an alternative silvicultural prescription (See below). This should exceed the TLMP Standards and Guidelines for that portion of the unit. The upper portion of the unit will be clearcut. This will meet all the TLMP Standards & Guidelines.

#### 4. Visuals:

Landscape viewed in the middle-ground from Port Camden. Past harvest activities are evident, yet work with features found in the characteristic landscape. Unit falls within the west Port Camden viewshed, future activities are designed to be consistent with the existing harvest patterns. Unit meets partial retention VQO as designed.

### B. TRANSPORTATION SYSTEM:

Specified road 46360 runs to the last landing (the north setting). It will continue past this unit in the future. A short temporary spur is needed for the eastern setting. The spur will be obliterated and the specified road put into "storage" after harvest is complete. All drainage structures will be removed to restore natural drainage patterns. Additional waterbars will be added as needed, and all areas of exposed soil will be grass seeded.

### C. SILVICULTURAL PRESCRIPTION SUMMARY:

(a) Clearcut for natural regeneration, use downhill cable yarding, manage as even-aged stand, certify regeneration, pre-commercial thin to increase diameter growth and to provide light for shrubs and forbs. (b) Seed Tree with Reserves using cable yarding, use upper and lower diameter limit Rx for hemlock and cedar. Reserve and paint 2 large spruce every 10 acres. Initial managed stand will have 3 cohorts; 1) Young trees from regeneration harvest. 2) Small residuals left from lower dia. limit harvest 3) Large residual trees with high wildlife value. Over time, it is expected that a 2-aged stand will develop as large trees are removed through senescence and wind snap or by windthrow.

### D. UNIT DESIGN:

Northern boundary is located over the slope break of the Class III stream to protect buffer from wind, but still avoids the steepest area of the streambank. Lower boundary is intentionally irregular to meet visual objectives.



# CRANE and ROWAN MOUNTAIN UNIT PLAN

**VCU-UNIT.ALT** 420-48.4

Management Prescription: Timber Production

Acres Even Aged: 8

Natural Stand Condition: Old Growth/Understory Reinitiation

Acres 2-Aged: 34

Desired Future Condition Even aged, 2-aged mixture

Acres Uneven Aged 0

Volume(MBF) 914.8

USGS 1/4 QUAD MAP #: PBG D6 SW

Aerial Photo: 77

Flight# 13

Photo#

51

## I. RESOURCE CONCERNS/OPPORTUNITIES - UNIT MANAGEMENT OBJECTIVES

Class III stream north of unit – maintain stream channel stability.

Southerly winds predominate – incorporate disturbance ecology principles.

Unit is seen from saltwater – meet modification VQO.

Wildlife Habitat - Maintain legacy structure in unit where possible for prey species habitat through alternative silvicultural prescription.

## II. IMPLEMENTATION ACTIVITIES

### A. ECOSYSTEMS MANAGEMENT:

#### 1. Vegetation:

Stand appears to be oldgrowth with patches of windthrow of 160 year cohort.

#### 2. Aquatic Habitat:

No Class I/II streams in Unit.

Class III: No programmed commercial timber harvest within the V-notch (side-slope break). Manage an appropriate distance beyond the slope break for windfirmness. (BMP 12.6 Riparian Area Designation and Protection; BMP 13.16 Stream Channel Protection) Stream to the north is in the High Gradient Contained Process Group. Manage the area within 120 feet from the top of the V-notch to provide for windfirmness by feathering the unit boundary. The deep V-notch will provide topographic protection for the no-cut buffer. Southeast winds predominate.

#### 3. Wildlife Habitat:

Retain multi-cohort stand structure to provide necessary habitat characteristics for forest dwelling species. Lower portion of the unit will be harvested using an alternative silvicultural prescription (See below). This should exceed the TLMP Standards and Guidelines for that portion of the unit. The upper portion of the unit will be clearcut. This will meet all the TLMP Standards & Guidelines.

#### 4. Visuals:

Landscape viewed in the middle-ground from Port Camden. Past harvest activities are evident, yet work with features found in the characteristic landscape. Unit falls within the west Port Camden viewshed, future activities are designed to be consistent with the existing harvest patterns. Unit meets partial retention VQO as designed.

### B. TRANSPORTATION SYSTEM:

Specified road 46360 runs to the last landing (the north setting). It will continue past this unit in the future. A short temporary spur is needed for the eastern setting. The spur will be obliterated and the specified road put into "storage" after harvest is complete. All drainage structures will be removed to restore natural drainage patterns. Additional waterbars will be added as needed, and all areas of exposed soil will be grass seeded.

### C. SILVICULTURAL PRESCRIPTION SUMMARY:

(a) Clearcut for natural regeneration, use downhill cable yarding, manage as even-aged stand, certify regeneration, pre-commercial thin to increase diameter growth and to provide light for shrubs and forbs. (b) Seed Tree with Reserves using cable yarding, use upper and lower diameter limit Rx for hemlock and cedar. Reserve and paint 2 large spruce every 10 acres. Initial managed stand will have 3 cohorts; 1) Young trees from regeneration harvest. 2) Small residuals left from lower dia. limit harvest 3) Large residual trees with high wildlife value. Over time, it is expected that a 2-aged stand will develop as large trees are removed through senescence and wind snap or by windthrow.

### D. UNIT DESIGN:

Northern boundary is located over the slope break of the Class III stream to protect buffer from wind, but still avoids the steepest area of the streambank. Lower boundary is intentionally irregular to meet visual objectives.





# CRANE and ROWAN MOUNTAIN UNIT PLAN

**VCU-UNIT.ALT 420-48.5**

Management Prescription: Timber Production

Natural Stand Condition: Old Growth/Understory Reinitiation

Desired Future Condition Even aged

Acres Even Aged: 42

Acres 2-Aged: 0

Acres Uneven Aged 0

Volume(MBF) 1411.2

Aerial Photo: 77 Flight# 13 Photo# 51

USGS 1/4 QUAD MAP #: PBG D6 SW

## RESOURCE CONCERNS/OPPORTUNITIES - UNIT MANAGEMENT OBJECTIVES

- Class III stream north of unit – maintain stream channel stability.
- Southerly winds predominate – incorporate disturbance ecology principles.
- Unit is seen from saltwater – meet modification VQO.

## II. IMPLEMENTATION ACTIVITIES

### A. ECOSYSTEMS MANAGEMENT:

#### 1. Vegetation:

Stand appears to be oldgrowth with patches of windthrow of 160 year cohort.

#### 2. Aquatic Habitat:

No Class I/II streams in Unit.

Class III: No programmed commercial timber harvest within the V-notch (side-slope break). Manage an appropriate distance beyond the slope break for windfirmness. (BMP 12.6 Riparian Area Designation and Protection; BMP 13.16 Stream Channel Protection) Stream to the north is in the High Gradient Contained Process Group. Manage the area within 120 feet from the top of the V-notch to provide for windfirmness by feathering the unit boundary. The deep V-notch will provide topographic protection for the no-cut buffer. Southeast winds predominate.

#### 3. Wildlife Habitat:

Unit is in medium deer HSI value and high Marten HIS value. South facing slope below 700 feet in elevation.

#### 4. Visuals:

Landscape viewed in the middle-ground from Port Camden. Past harvest activities are evident, yet work with features found in the characteristic landscape. Unit falls within the west Port Camden viewshed, future activities are designed to be consistent with the existing harvest patterns. Unit meets modification VQO as designed.

### B. TRANSPORTATION SYSTEM:

Specified road 46360 runs to the last landing (the north setting). It will continue past this unit in the future. A short temporary spur is needed for the eastern setting. The spur will be obliterated and the specified road put into "storage" after harvest is complete. All drainage structures will be removed to restore natural drainage patterns. Additional waterbars will be added as needed, and all areas of exposed soil will be grass seeded.

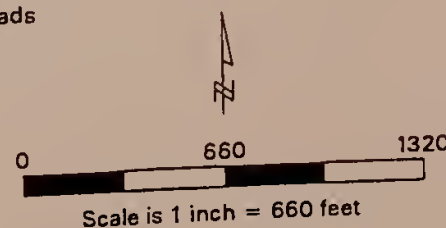
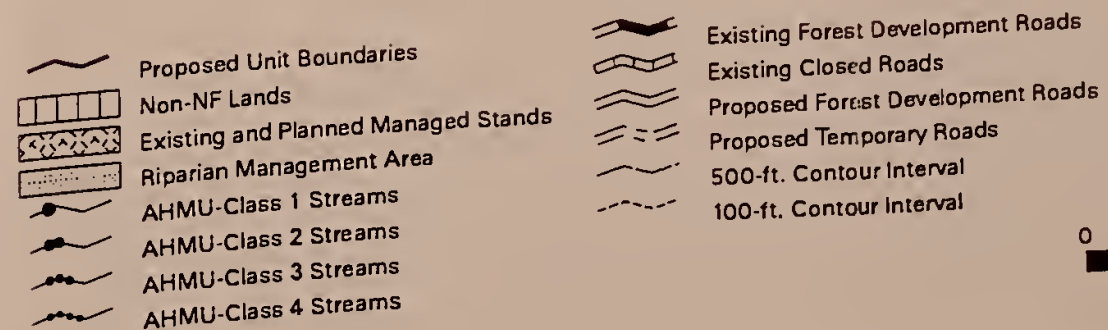
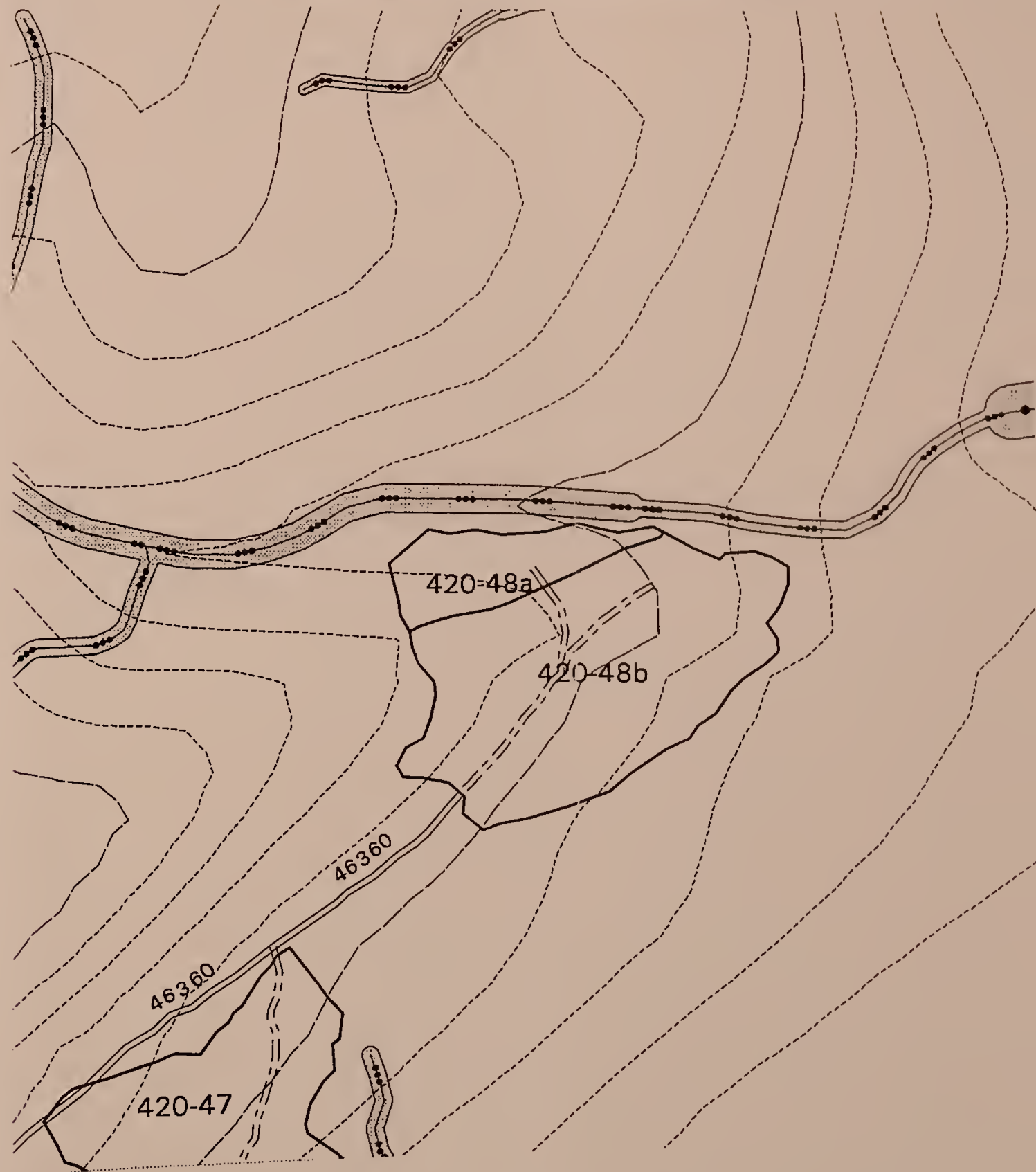
### C. SILVICULTURAL PRESCRIPTION SUMMARY:

(a) Clearcut for natural regeneration, use downhill cable yarding, manage as even-aged stand, certify regeneration, pre-commercial thin to increase diameter growth and to provide light for shrubs and forbs. (b) is same as (a) with uphill cable yarding system.

### D. UNIT DESIGN:

Northern boundary is located over the slope break of the Class III stream to protect buffer from wind, but still avoids the steepest area of the streambank. Lower boundary is intentionally irregular to meet visual objectives.

## Crane/Rowan Timber Harvest Unit 420-48





## CRANE and ROWAN MOUNTAIN UNIT PLAN

**VCU-UNIT.ALT** 421-49.2

Management Prescription: Timber Production

Acres Even Aged: 97

Natural Stand Condition: Understory Reinitiation

Acres 2-Aged: 0

Desired Future Condition: Even aged

Acres Uneven Aged: 0

Volume(MBF) 3259.2

USGS 1/4 QUAD MAP #: PTA D1 SE

Aerial Photo: 77 Flight# 9 Photo# 145

### I. RESOURCE CONCERNS/OPPORTUNITIES - UNIT MANAGEMENT OBJECTIVES

(Unit was laid out under N & E Kuiu ROD direction)

Unit modifications are not necessary to meet TLMP Revision Standards & Guidelines.

Class I and II stream on western boundary - maintain windfirm riparian buffer.

Class III stream on northwest corner - maintain windfirm riparian buffer.

Class IV stream in middle of unit and another extending into the southern boundary - maintain stream channel stability.

Western boundary stream is deeply incised with unstable stream banks - avoid unstable soils.

Southwest winds predominate - incorporate disturbance ecology principles.

### II. IMPLEMENTATION ACTIVITIES

#### A. ECOSYSTEMS MANAGEMENT:

##### 1. Vegetation:

Stand is windthrown with several cohorts evident.

##### 2. Aquatic Habitat:

Class I/II: No commercial harvest within 100 feet. No programmed commercial harvest within the RMA. Manage an appropriate distance beyond the no harvest zone to provide windfirmness. (BMP 12.6 Riparian Area Designation and Protection; BMP 13.16 Stream Channel Protection) The stream to the west is in the High Gradient Contained Process Group. Manage the area 120 feet beyond the V-notch to provide for windfirmness. Since this buffer will be exposed to SE winds, remove any tall trees and feather the buffer.

Class III: No programmed commercial timber harvest within the V-notch (side-slope break). Manage an appropriate distance beyond the slope break for windfirmness. (BMP 12.6 Riparian Area Designation and Protection; BMP 13.16 Stream Channel Protection) The stream to the north is in the High Gradient Contained Process Group. Manage the area within 120 feet of the V-notch to provide for windfirmness. Since SE winds predominate, pay special attention to the layout of this buffer.

Class IV: Provide adequate deflection to minimize soil disturbance by using tailtrees on ridge adjacent to the stream. Partially suspend logs over the stream. (BMP 13.16 Stream Channel Protection)

##### 3. Wildlife Habitat:

Unit is in high/medium deer HSI value and high Marten HIS value. South facing slope below 1300 feet in elevation.

##### 4. Visuals:

#### B. TRANSPORTATION SYSTEM:

Specified road 46152 runs up through the unit and continues towards the east to units 421-50 & 51. Specified road 46154 accesses the northeast settings of this unit and will continue in the future. Two short temporary are needed to reach landing sites. The spurs will be obliterated and the specified road put into "storage" after harvest is complete. All drainage structures will be removed to restore natural drainage patterns. Additional waterbars will be added as needed, and all areas of exposed soil will be grass seeded.

#### C. SILVICULTURAL PRESCRIPTION SUMMARY:

(a) Clearcut for natural regeneration, use downhill cable yarding, manage as even-aged stand, certify regeneration, pre-commercial thin to increase diameter growth and to provide light for shrubs and forbs. (b) is same as (a) with uphill cable yarding system.

#### D. UNIT DESIGN:

Locate unit boundary at the upper slope break of the incised v-notch (more than 100-feet away from stream).

Stream buffer is undisturbed on the west side, so should remain windfirm.

There is some windthrow risk to the eastern upper boundary.





# CRANE and ROWAN MOUNTAIN UNIT PLAN

**VCU-UNIT.ALT** 421-49.3

Management Prescription: Timber Production

Acres Even Aged: 29

Natural Stand Condition: Understory Reinitiation

Acres 2-Aged: 68

Desired Future Condition Even aged, 2-aged mixture

Acres Uneven Aged 0

Volume(MBF) 2266.4

USGS 1/4 QUAD MAP #: PTA D1 SE

Aerial Photo: 77 Flight# 9 Photo# 145

## I. RESOURCE CONCERNS/OPPORTUNITIES - UNIT MANAGEMENT OBJECTIVES

(Unit was laid out under N & E Kuiu ROD direction. Unit modifications are not necessary to meet TLMP Revision Standards & Guidelines.

Class I and II stream on western boundary - maintain windfirm riparian buffer.

Class III stream on northwest corner - maintain windfirm riparian buffer.

Class IV stream in middle of unit and another extending into the southern boundary - maintain stream channel stability.

Western boundary stream is deeply incised with unstable stream banks - avoid unstable soils.

Southwest winds predominate - incorporate disturbance ecology principles.

Stand is Understory Reinitiation windthrown multi-cohort - maintain multicohort structure.

Wildlife Habitat - Maintain legacy structure in unit where possible for prey species habitat through alternative silvicultural prescription.

## II. IMPLEMENTATION ACTIVITIES

### A. ECOSYSTEMS MANAGEMENT:

#### 1. Vegetation:

Stand is windthrown with several cohorts evident.

#### 2. Aquatic Habitat:

Class I/II: No commercial harvest within 100 feet. No programmed commercial harvest within the RMA. Manage an appropriate distance beyond the no harvest zone to provide windfirmness. (BMP 12.6 Riparian Area Designation and Protection; BMP 13.16 Stream Channel Protection) The stream to the west is in the High Gradient Contained Process Group. Manage the area 120 feet beyond the V-notch to provide for windfirmness. Since this buffer will be exposed to SE winds, remove any tall trees and feather the buffer.

Class III: No programmed commercial timber harvest within the V-notch (side-slope break). Manage an appropriate distance beyond the slope break for windfirmness. (BMP 12.6 Riparian Area Designation and Protection; BMP 13.16 Stream Channel Protection) The stream to the north is in the High Gradient Contained Process Group. Manage the area within 120 feet of the V-notch to provide for windfirmness. Since SE winds predominate, pay special attention to the layout of this buffer.

Class IV: Provide adequate deflection to minimize soil disturbance by using tailtrees on ridge adjacent to the stream. Partially suspend logs over the stream. (BMP 13.16 Stream Channel Protection)

#### 3. Wildlife Habitat:

Retain multi-cohort stand structure and legacy to provide necessary habitat characteristics for forest dwelling species. Part of the unit will be harvested using alternative silvicultural prescriptions. This should exceed TLMP S&Gs.

#### 4. Visuals:

### B. TRANSPORTATION SYSTEM:

Specified road 46152 runs up through the unit and continues towards the east to units 421-50 & 51. Specified road 46154 accesses the northeast settings of this unit and will continue in the future. Two short temporary are needed to reach landing sites. The spurs will be obliterated and the specified road put into "storage" after harvest is complete. All drainage structures will be removed to restore natural drainage patterns. Additional waterbars will be added as needed, and all areas of exposed soil will be grass seeded.

### C. SILVICULTURAL PRESCRIPTION SUMMARY:

(a) Clearcut for natural regeneration, use downhill cable yarding, manage as even-aged stand, certify regeneration, pre-commercial thin to increase diameter growth and to provide light for shrubs and forbs. (b) Seed Tree with Reserves using cable yarding, use upper and lower diameter limit Rx for hemlock and cedar. Reserve and paint 2 large spruce every 10 acres. Initial managed stand will have 3 cohorts; 1) Young trees from regeneration harvest. 2) Small residuals left from lower dia. limit harvest 3) Large residual trees with high wildlife value. Over time, it is expected that a 2-aged stand will develop as large trees are removed through senescence and wind snap or by windthrow.

### D. UNIT DESIGN:

Locate unit boundary at the upper slope break of the incised v-notch (more than 100-feet away from stream). Stream buffer is undisturbed on the west side, so should remain windfirm.



# CRANE and ROWAN MOUNTAIN UNIT PLAN

**VCU-UNIT.ALT 421-49.4**

Management Prescription: Timber Production

Acres Even Aged: 29

Natural Stand Condition: Understory Reinitiation

Acres 2-Aged: 68

Desired Future Condition Even aged, 2-aged mixture

Acres Uneven Aged 0

Volume(MBF) 2266.4

USGS 1/4 QUAD MAP #: PTA D1 SE

Aerial Photo: 77 Flight# 9 Photo# 145

## I. RESOURCE CONCERNS/OPPORTUNITIES - UNIT MANAGEMENT OBJECTIVES

(Unit was laid out under N & E Kuiu ROD direction)  
Unit modifications are not necessary to meet TLMP Revision Standards & Guidelines.  
Class I and II stream on western boundary - maintain windfirm riparian buffer.  
Class III stream on northwest corner - maintain windfirm riparian buffer.  
Class IV stream in middle of unit and another extending into the southern boundary - maintain stream channel stability.  
Western boundary stream is deeply incised with unstable stream banks - avoid unstable soils.  
Southwest winds predominate - incorporate disturbance ecology principles.  
Stand is Understory Reinitiation windthrown multi-cohort - maintain multicohort structure.  
Wildlife Habitat - Maintain legacy structure in unit where possible for prey species habitat through alternative silvicultural prescription.

## II. IMPLEMENTATION ACTIVITIES

### A. ECOSYSTEMS MANAGEMENT:

#### 1. Vegetation:

Stand is windthrown with several cohorts evident.

#### 2. Aquatic Habitat:

Class I/II: No commercial harvest within 100 feet. No programmed commercial harvest within the RMA. Manage an appropriate distance beyond the no harvest zone to provide windfirmness. (BMP 12.6 Riparian Area Designation and Protection; BMP 13.16 Stream Channel Protection) The stream to the west is in the High Gradient Contained Process Group. Manage the area 120 feet beyond the V-notch to provide for windfirmness. Since this buffer will be exposed to SE winds, remove any tall trees and feather the buffer.

Class III: No programmed commercial timber harvest within the V-notch (side-slope break). Manage an appropriate distance beyond the slope break for windfirmness. (BMP 12.6 Riparian Area Designation and Protection; BMP 13.16 Stream Channel Protection) The stream to the north is in the High Gradient Contained Process Group. Manage the area within 120 feet of the V-notch to provide for windfirmness. Since SE winds predominate, pay special attention to the layout of this buffer.

Class IV: Provide adequate deflection to minimize soil disturbance by using tailtrees on ridge adjacent to the stream. Partially suspend logs over the stream. (BMP 13.16 Stream Channel Protection)

#### 3. Wildlife Habitat:

Retain multi-cohort stand structure and legacy to provide necessary habitat characteristics for forest dwelling species. Part of the unit will be harvested using alternative silvicultural prescriptions. This should exceed TLMP S&Gs.

#### 4. Visuals:

### B. TRANSPORTATION SYSTEM:

Specified road 46152 runs up through the unit and continues towards the east to units 421-50 & 51. Specified road 46154 accesses the northeast settings of this unit and will continue in the future. Two short temporary are needed to reach landing sites. The spurs will be obliterated and the specified road put into "storage" after harvest is complete. All drainage structures will be removed to restore natural drainage patterns. Additional waterbars will be added as needed, and all areas of exposed soil will be grass seeded.

### C. SILVICULTURAL PRESCRIPTION SUMMARY:

(a) Clearcut for natural regeneration, use downhill cable yarding, manage as even-aged stand, certify regeneration, pre-commercial thin to increase diameter growth and to provide light for shrubs and forbs. (b) Seed Tree with Reserves using cable yarding, use upper and lower diameter limit Rx for hemlock and cedar. Reserve and paint 2 large spruce every 10 acres. Initial managed stand will have 3 cohorts; 1) Young trees from regeneration harvest. 2) Small residuals left from lower dia. limit harvest 3) Large residual trees with high wildlife value. Over time, it is expected that a 2-aged stand will develop as large trees are removed through senescence and wind snap or by windthrow.

### D. UNIT DESIGN:

Locate unit boundary at the upper slope break of the incised v-notch (more than 100-feet away from stream).  
Stream buffer is undisturbed on the west side, so should remain windfirm.  
There is some windthrow risk to the eastern upper boundary.





# CRANE and ROWAN MOUNTAIN UNIT PLAN

VCU-UNIT.ALT 421-49.5

Management Prescription: Timber Production

Natural Stand Condition: Understory Reinitiation

Desired Future Condition: Even aged

Acres Even Aged: 97

Acres 2-Aged: 0

Acres Uneven Aged: 0

Volume(MBF) 3259.2

Aerial Photo: 77

Flight# 9

Photo# 145

USGS 1/4 QUAD MAP #: PTA D1 SE

## RESOURCE CONCERNS/OPPORTUNITIES - UNIT MANAGEMENT OBJECTIVES

- (Unit was laid out under N & E Kuiu ROD direction)  
 Unit modifications are not necessary to meet TLMP Revision Standards & Guidelines.  
 Class I and II stream on western boundary - maintain windfirm riparian buffer.  
 Class III stream on northwest corner - maintain windfirm riparian buffer.  
 Class IV stream in middle of unit and another extending into the southern boundary - maintain stream channel stability.  
 Western boundary stream is deeply incised with unstable stream banks - avoid unstable soils.  
 Southwest winds predominate - incorporate disturbance ecology principles.

## IMPLEMENTATION ACTIVITIES

### A. ECOSYSTEMS MANAGEMENT:

#### 1. Vegetation:

Stand is windthrown with several cohorts evident.

#### 2. Aquatic Habitat:

Class III: No commercial harvest within 100 feet. No programmed commercial harvest within the RMA. Manage an appropriate distance beyond the no harvest zone to provide windfirmness. (BMP 12.6 Riparian Area Designation and Protection; BMP 13.16 Stream Channel Protection) The stream to the west is in the High Gradient Contained Process Group. Manage the area 120 feet beyond the V-notch to provide for windfirmness. Since this buffer will be exposed to SE winds, remove any tall trees and feather the buffer.

Class III: No programmed commercial timber harvest within the V-notch (side-slope break). Manage an appropriate distance beyond the slope break for windfirmness. (BMP 12.6 Riparian Area Designation and Protection; BMP 13.16 Stream Channel Protection) The stream to the north is in the High Gradient Contained Process Group. Manage the area within 120 feet of the V-notch to provide for windfirmness. Since SE winds predominate, pay special attention to the layout of this buffer.

Class IV: Provide adequate deflection to minimize soil disturbance by using tailtrees on ridge adjacent to the stream. Partially suspend logs over the stream. (BMP 13.16 Stream Channel Protection)

#### 3. Wildlife Habitat:

Unit is in high/medium deer HSI value and high Marten HIS value. South facing slope below 1300 feet in elevation.

#### 4. Visuals:

### B. TRANSPORTATION SYSTEM:

Specified road 46152 runs up through the unit and continues towards the east to units 421-50 & 51. Specified road 46154 accesses the northeast settings of this unit and will continue in the future. Two short temporary are needed to reach landing sites. The spurs will be obliterated and the specified road put into "storage" after harvest is complete. All drainage structures will be removed to restore natural drainage patterns. Additional waterbars will be added as needed, and all areas of exposed soil will be grass seeded.

### C. SILVICULTURAL PRESCRIPTION SUMMARY:

(a) Clearcut for natural regeneration, use downhill cable yarding, manage as even-aged stand, certify regeneration, pre-commercial thin to increase diameter growth and to provide light for shrubs and forbs. (b) is same as (a) with uphill cable yarding system.

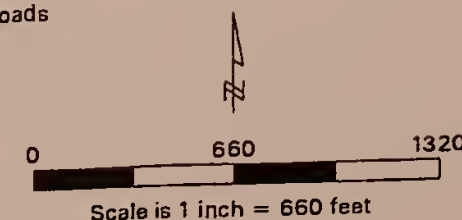
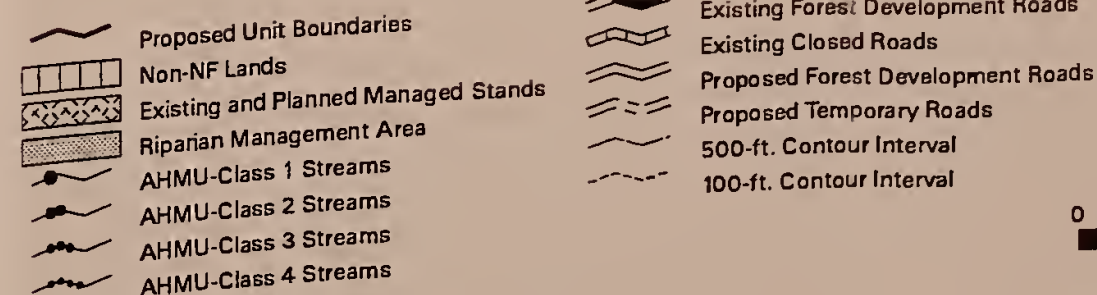
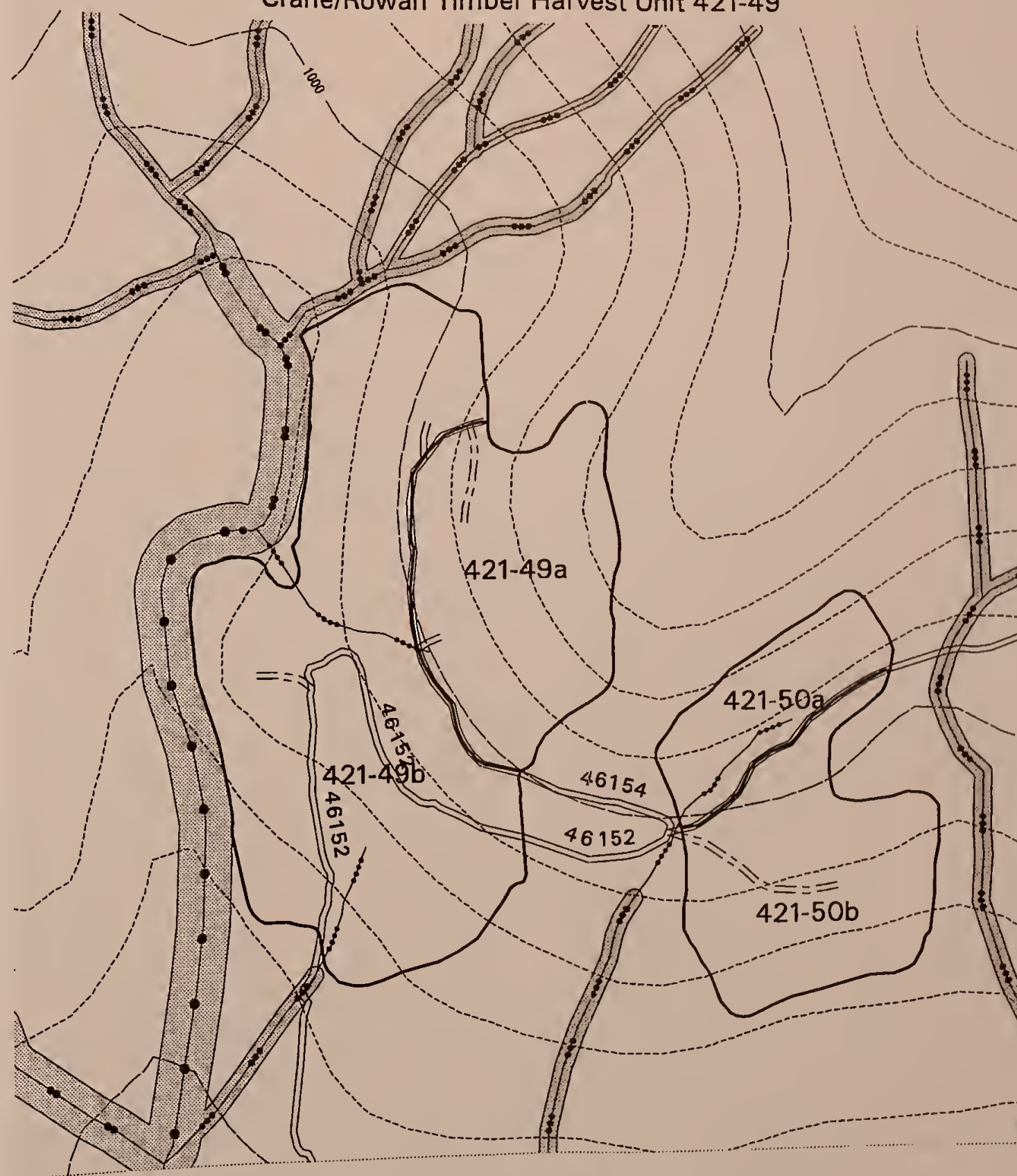
### D. UNIT DESIGN:

Locate unit boundary at the upper slope break of the incised v-notch (more than 100-feet away from stream).

Stream buffer is undisturbed on the west side, so should remain windfirm.

There is some windthrow risk to the eastern upper boundary.

## Crane/Rowan Timber Harvest Unit 421-49







# CRANE and ROWAN MOUNTAIN UNIT PLAN

**VCU-UNIT.ALT** 421-50.2

Management Prescription: Timber Production

Acres Even Aged: 39

Natural Stand Condition: Old Growth

Acres 2-Aged: 0

Desired Future Condition Even aged

Acres Uneven Aged 0

Volume(MBF) 1310.4

USGS 1/4 QUAD MAP #: PTA D1 SE

Aerial Photo: 77

Flight# 9

Photo# 145

## I. RESOURCE CONCERNS/OPPORTUNITIES - UNIT MANAGEMENT OBJECTIVES

Class III stream to the east of unit - maintain stream channel stability.  
Class IV stream in upper portion of unit  
Stream to the east is deeply incised with unstable stream banks - avoid unstable soils.  
Southwest winds predominate - incorporate disturbance ecology principles.

## II. IMPLEMENTATION ACTIVITIES

### A. ECOSYSTEMS MANAGEMENT:

#### 1. Vegetation:

Stand is poor site and is an open stand with no apparent cohorts

#### 2. Aquatic Habitat:

No Class I/II streams in Unit.

Class III: No programmed commercial timber harvest within the V-notch (side-slope break). Manage an appropriate distance beyond the slope break for windfirmness. (BMP 12.6 Riparian Area Designation and Protection; BMP 13.16 Stream Channel Protection) The unit is designed to avoid the Class III to the east.

Class IV: Provide adequate deflection to minimize soil disturbance by using tailtrees on ridge adjacent to the stream. Partially suspend logs over the stream. (BMP 13.16 Stream Channel Protection)

#### 3. Wildlife Habitat:

Unit is in high/medium deer HSI value and high Marten HIS value. South facing slope below 1300 feet in elevation.

#### 4. Visuals:

### B. TRANSPORTATION SYSTEM:

Specified road 46152 continues through the northern setting. A temporary spur road will access southern setting. The spur will be obliterated and the specified road put into "storage" after harvest is complete. All drainage structures will be removed to restore natural drainage patterns. Additional waterbars will be added as needed, and all areas of exposed soil will be grass seeded.

### C. SILVICULTURAL PRESCRIPTION SUMMARY:

(a) Clearcut for natural regeneration, use downhill cable yarding, manage as even-aged stand, certify regeneration, pre-commercial thin to increase diameter growth and to provide light for shrubs and forbs. (b) is same as (a) with uphill cable yarding system.

### D. UNIT DESIGN:

Eastern boundary follows scrubby windfirm timber.

Minimize sharp corners during unit layout to ensure meeting inventoried VQO of Modification.

The 200-foot buffer along the Class III stream was designed to stay out of the steep v-notch.





# CRANE and ROWAN MOUNTAIN UNIT PLAN

**VCU-UNIT.ALT** 421-50.3

Management Prescription: Timber Production

Acres Even Aged: 12

Natural Stand Condition: Old Growth

Acres 2-Aged: 27

Desired Future Condition Even aged, 2-aged mixture

Acres Uneven Aged 0

Volume(MBF) 916.2

USGS 1/4 QUAD MAP #: PTA D1 SE

Aerial Photo: 77

Flight# 9

Photo#

145

## I. RESOURCE CONCERNS/OPPORTUNITIES - UNIT MANAGEMENT OBJECTIVES

Class III stream to the east of unit - maintain stream channel stability.

Class IV stream in upper portion of unit

Stream to the east is deeply incised with unstable stream banks - avoid unstable soils.

Southwest winds predominate - incorporate disturbance ecology principles.

Wildlife Habitat - Maintain legacy structure in unit where possible for prey species habitat through alternative silvicultural prescription.

## II. IMPLEMENTATION ACTIVITIES

### A. ECOSYSTEMS MANAGEMENT:

#### 1. Vegetation:

Stand is poor site and is an open stand with no apparent cohorts.

#### 2. Aquatic Habitat:

No Class I/II streams in Unit.

Class III: No programmed commercial timber harvest within the V-notch (side-slope break). Manage an appropriate distance beyond the slope break for windfirmness. (BMP 12.6 Riparian Area Designation and Protection; BMP 13.16 Stream Channel Protection) The unit is designed to avoid the Class III to the east.

Class IV: Provide adequate deflection to minimize soil disturbance by using tailtrees on ridge adjacent to the stream. Partially suspend logs over the stream. (BMP 13.16 Stream Channel Protection)

#### 3. Wildlife Habitat:

Retain multi-cohort stand structure and legacy to provide necessary habitat characteristics for forest dwelling species. Part of the unit will be harvested using alternative silvicultural prescriptions. This should exceed TLMP S&Gs.

#### 4. Visuals:

### B. TRANSPORTATION SYSTEM:

Specified road 46152 continues through the northern setting. A temporary spur road will access southern setting. The spur will be obliterated and the specified road put into "storage" after harvest is complete. All drainage structures will be removed to restore natural drainage patterns. Additional waterbars will be added as needed, and all areas of exposed soil will be grass seeded.

### C. SILVICULTURAL PRESCRIPTION SUMMARY:

(a) Clearcut for natural regeneration, use downhill cable yarding, manage as even-aged stand, certify regeneration, pre-commercial thin to increase diameter growth and to provide light for shrubs and forbs. (b) Seed Tree with Reserves using cable yarding, use upper and lower diameter limit Rx for hemlock and cedar. Reserve and paint 2 large spruce every 10 acres. Initial managed stand will have 3 cohorts; 1) Young trees from regeneration harvest. 2) Small residuals left from lower dia. limit harvest 3) Large residual trees with high wildlife value. Over time, it is expected that a 2-aged stand will develop as large trees are removed through senescence and wind snap or by windthrow.

### D. UNIT DESIGN:

Eastern boundary follows scrubby windfirm timber.

Minimize sharp corners during unit layout to ensure meeting inventoried VQO of Modification.

The 200-foot buffer along the Class III stream was designed to stay out of the steep v-notch.



# CRANE and ROWAN MOUNTAIN UNIT PLAN

**VCU-UNIT.ALT** 421-50.4

Management Prescription: Timber Production

Acres Even Aged: 12

Natural Stand Condition: Old Growth

Acres 2-Aged: 27

Desired Future Condition Even aged, 2-aged mixture

Acres Uneven Aged 0

Volume(MBF) 916.2

USGS 1/4 QUAD MAP #: PTA D1 SE

Aerial Photo: 77

Flight# 9

Photo# 145

## I. RESOURCE CONCERNS/OPPORTUNITIES - UNIT MANAGEMENT OBJECTIVES

Class III stream to the east of unit - maintain stream channel stability.

Class IC in upper portion of unit.

Stream to the east is deeply incised with unstable stream banks - avoid unstable soils.

Southwest winds predominate - incorporate disturbance ecology principles.

Wildlife Habitat - Maintain legacy structure in unit where possible for prey species habitat through alternative silvicultural prescription.

## II. IMPLEMENTATION ACTIVITIES

### A. ECOSYSTEMS MANAGEMENT:

#### 1. Vegetation:

Stand is poor site and is an open stand with no apparent cohorts.

#### 2. Aquatic Habitat:

No Class I/II streams in Unit.

Class III: No programmed commercial timber harvest within the V-notch (side-slope break). Manage an appropriate distance beyond the slope break for windfirmness. (BMP 12.6 Riparian Area Designation and Protection; BMP 13.16 Stream Channel Protection) The unit is designed to avoid the Class III to the east.

Class IV: Provide adequate deflection to minimize soil disturbance by using tailtrees on ridge adjacent to the stream. Partially suspend logs over the stream.( BMP 13.16 Stream Channel Protection)

#### 3. Wildlife Habitat:

Retain multi-cohort stand structure and legacy to provide necessary habitat characteristics for forest dwelling species. Part of the unit will be harvested using alternative silvicultural prescriptions. This should exceed TLMP S&Gs.

#### 4. Visuals:

### B. TRANSPORTATION SYSTEM:

Specified road 46152 continues through the northern setting. A temporary spur road will access southern setting. The spur will be obliterated and the specified road put into "storage" after harvest is complete. All drainage structures will be removed to restore natural drainage patterns. Additional waterbars will be added as needed, and all areas of exposed soil will be grass seeded.

### C. SILVICULTURAL PRESCRIPTION SUMMARY:

(a) Clearcut for natural regeneration, use downhill cable yarding, manage as even-aged stand, certify regeneration, pre-commercial thin to increase diameter growth and to provide light for shrubs and forbs. (b) Seed Tree with Reserves using cable yarding, use upper and lower diameter limit Rx for hemlock and cedar. Reserve and paint 2 large spruce every 10 acres. Initial managed stand will have 3 cohorts; 1) Young trees from regeneration harvest. 2) Small residuals left from lower dia. limit harvest 3) Large residual trees with high wildlife value. Over time, it is expected that a 2-aged stand will develop as large trees are removed through senescence and wind snap or by windthrow.

### D. UNIT DESIGN:

Eastern boundary follows scrubby windfirm timber.

Minimize sharp corners during unit layout to ensure meeting inventoried VQO of Modification.

The 200-foot buffer along the Class III stream was designed to stay out of the steep v-notch.





CRANE and ROWAN MOUNTAIN UNIT PLAN

**VCU-UNIT.ALT** 421-50.5

Management Prescription: Timber Production

Natural Stand Condition: Old Growth

Desired Future Condition Even aged

Acres Even Aged: 39

Acres 2-Aged: 0

Acres Uneven Aged 0

Volume(MBF) 1310.4

USGS 1/4 QUAD MAP #: PTA D1 SE

Aerial Photo: 77

Flight# 9

Photo# 145

**I. RESOURCE CONCERNS/OPPORTUNITIES - UNIT MANAGEMENT OBJECTIVES**

Class III stream to the east of unit - maintain stream channel stability.  
Class IV stream in upper portion of unit  
Stream to the east is deeply incised with unstable stream banks - avoid unstable soils.  
Southwest winds predominate - incorporate disturbance ecology principles.

**II. IMPLEMENTATION ACTIVITIES**

**A. ECOSYSTEMS MANAGEMENT:**

1. Vegetation:  
Stand is poor site and is an open stand with no apparent cohorts

2. Aquatic Habitat:  
No Class I/II streams in Unit.  
Class III: No programmed commercial timber harvest within the V-notch (side-slope break). Manage an appropriate distance beyond the slope break for windfirmness. (BMP 12.6 Riparian Area Designation and Protection; BMP 13.16 Stream Channel Protection) The unit is designed to avoid the Class III to the east. Both streams are in the High Gradient Contained Process Group. Manage the area within 120 feet from the top of the V-notch for windfirmness. Since southeast winds predominate and the streams are parallel to prevailing winds, the no-cut buffer should be windfirm.  
Class IV: Provide adequate deflection to minimize soil disturbance by using tailtrees on ridge adjacent to the stream. Partially suspend logs over the stream.( BMP13.16 Stream Channel Protection)

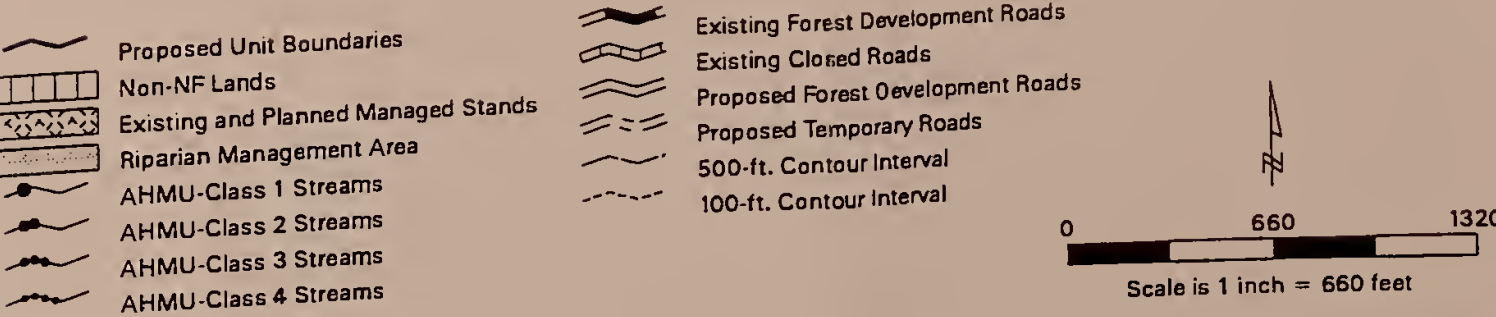
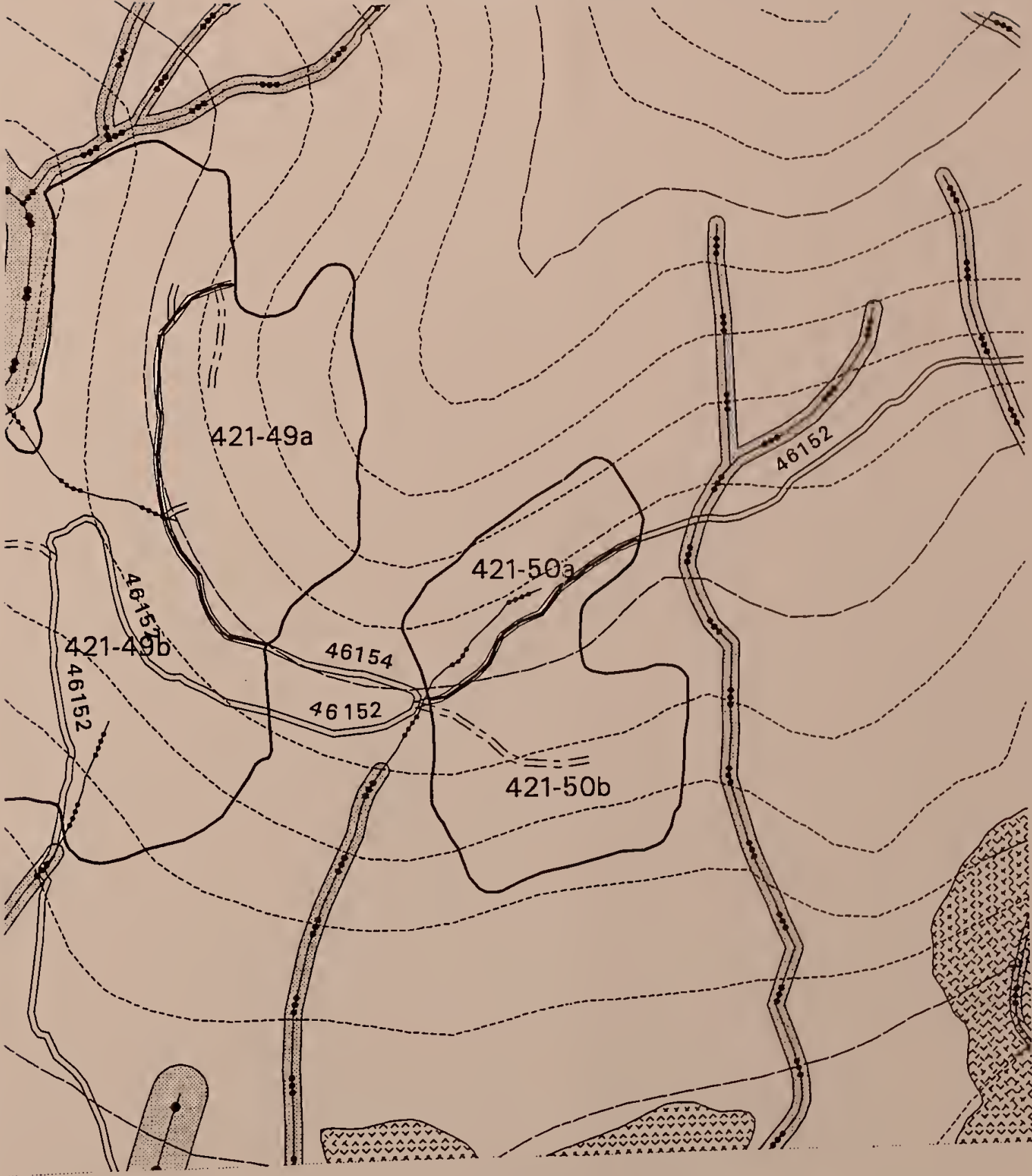
3. Wildlife Habitat:  
Unit is in high/medium deer HSI value and high Marten HIS value. South facing slope below 1300 feet in elevation.

4. Visuals:  
B. TRANSPORTATION SYSTEM:  
Specified road 46152 continues through the northern setting. A temporary spur road will access southern setting. The spur will be obliterated and the specified road put into "storage" after harvest is complete. All drainage structures will be removed to restore natural drainage patterns. Additional waterbars will be added as needed, and all areas of exposed soil will be grass seeded.

C. SILVICULTURAL PRESCRIPTION SUMMARY:  
(a) Clearcut for natural regeneration, use downhill cable yarding, manage as even-aged stand, certify regeneration, pre-commercial thin to increase diameter growth and to provide light for shrubs and forbs. (b) is same as (a) with uphill cable yarding system.

D. UNIT DESIGN:  
Eastern boundary follows scrubby windfirm timber.  
Minimize sharp corners during unit layout to ensure meeting inventoried VQO of Modification.  
The 200-foot buffer along the Class III stream was designed to stay out of the steep v-notch.

Crane/Rowan Timber Harvest Unit 421-50





# CRANE and ROWAN MOUNTAIN UNIT PLAN

**VCU-UNIT.ALT 421-51.2**

Management Prescription: **Timber Production**

Acres Even Aged: 57

Natural Stand Condition: **Understory Reinitiation**

Acres 2-Aged: 0

Desired Future Condition **Even aged**

Acres Uneven Aged 0

Volume(MBF) 1915.2

USGS 1/4 QUAD MAP #: **PTA D1 SE**

Aerial Photo: 77

Flight# 9

Photo# 145

## I. RESOURCE CONCERNS/OPPORTUNITIES - UNIT MANAGEMENT OBJECTIVES

Class III streams on east and west sides of unit - maintain stream channel stability.

Class IV stream within unit - provide - maintain stream channel stability.

Southwest winds predominate - incorporate disturbance ecology principles.

## II. IMPLEMENTATION ACTIVITIES

### A. ECOSYSTEMS MANAGEMENT:

#### 1. Vegetation:

Stand is of wind origin and is in understory reinitiation stage.

#### 2. Aquatic Habitat:

No Class I/II streams in Unit.

Class III: No programmed commercial timber harvest within the V-notch (side-slope break). Manage an appropriate distance beyond the slope break for windfirmness. (BMP 12.6 Riparian Area Designation and Protection; BMP 13.16 Stream Channel Protection) The unit is designed to avoid the Class III to the east. Both streams are in the High Gradient Contained Process Group. Manage the area within 120 feet from the top of the V-notch for windfirmness. Both buffers may be exposed to wind because there is evidence in the area of both SE and SW wind.

Class IV: Provide adequate deflection to minimize soil disturbance by using tailtrees on ridge adjacent to the stream.

Partially suspend logs over the stream.( BMP 13.16 Stream Channel Protection)

#### 3. Wildlife Habitat:

Unit is in high/medium deer HSI value and high Marten HIS value. South facing slope below 1300 feet in elevation.

#### 4. Visuals:

### B. TRANSPORTATION SYSTEM:

Specified road 46360 runs to the last landing (the eastern setting). It will continue past this unit in the future. The specified road will be put into "storage" after harvest is complete. All drainage structures will be removed to restore natural drainage patterns. Additional waterbars will be added as needed, and all areas of exposed soil will be grass seeded.

### C. SILVICULTURAL PRESCRIPTION SUMMARY:

(a) Clearcut for natural regeneration, use downhill cable yarding, manage as even-aged stand, certify regeneration, pre-commercial thin to increase diameter growth and to provide light for shrubs and forbs. (b) is same as (a) with uphill cable yarding system.

### D. UNIT DESIGN:

The extended buffers along Class III streams were designed to protect the steep v-notch.

V-notch along east side of unit will have extended buffer to insure windfirmness.





## CRANE and ROWAN MOUNTAIN UNIT PLAN

**VCU-UNIT.ALT** 421-51.3

Management Prescription: Timber Production

Acres Even Aged: 13

Natural Stand Condition: Understory Reinitiation

Acres 2-Aged: 44

Desired Future Condition Even aged, 2-aged mixture

Acres Uneven Aged 0

Volume(MBF) 1272.8

USGS 1/4 QUAD MAP #: PTA D1 SE

Aerial Photo: 77

Flight# 9

Photo# 145

### I. RESOURCE CONCERNS/OPPORTUNITIES - UNIT MANAGEMENT OBJECTIVES

Class III streams on east and west sides of unit - maintain stream channel stability.

Class IV stream within unit - provide - maintain stream channel stability.

Southwest winds predominate - incorporate disturbance ecology principles.

Wildlife Habitat - Maintain legacy structure in unit where possible for prey species habitat through alternative silvicultural prescription.

### II. IMPLEMENTATION ACTIVITIES

#### A. ECOSYSTEMS MANAGEMENT:

##### 1. Vegetation:

Stand is of wind origin and is in understory reinitiation stage.

##### 2. Aquatic Habitat:

No Class I/II streams in Unit.

Class III: No programmed commercial timber harvest within the V-notch (side-slope break). Manage an appropriate distance beyond the slope break for windfirmness. (BMP 12.6 Riparian Area Designation and Protection; BMP 13.16 Stream Channel Protection) The unit is designed to avoid the Class III to the east. Both streams are in the High Gradient Contained Process Group. Manage the area within 120 feet from the top of the V-notch for windfirmness. Both buffers may be exposed to wind because there is evidence in the area of both SE and SW wind.

Class IV: Provide adequate deflection to minimize soil disturbance by using tailtrees on ridge adjacent to the stream. Partially suspend logs over the stream.( BMP 13.16 Stream Channel Protection)

##### 3. Wildlife Habitat:

Retain multi-cohort stand structure and legacy to provide necessary habitat characteristics for forest dwelling species. Part of the unit will be harvested using alternative silvicultural prescriptions. This should exceed TLMP S&Gs.

##### 4. Visuals:

#### B. TRANSPORTATION SYSTEM:

Specified road 46360 runs to the last landing (the eastern setting). It will continue past this unit in the future. The specified road will be put into "storage" after harvest is complete. All drainage structures will be removed to restore natural drainage patterns. Additional waterbars will be added as needed, and all areas of exposed soil will be grass seeded.

#### C. SILVICULTURAL PRESCRIPTION SUMMARY:

(a) Clearcut for natural regeneration, use downhill cable yarding, manage as even-aged stand, certify regeneration, pre-commercial thin to increase diameter growth and to provide light for shrubs and forbs. (b) Seed Tree with Reserves using cable yarding, use upper and lower diameter limit Rx for hemlock and cedar. Reserve and paint 2 large spruce every 10 acres. Initial managed stand will have 3 cohorts; 1) Young trees from regeneration harvest. 2) Small residuals left from lower dia. limit harvest 3) Large residual trees with high wildlife value. Over time, it is expected that a 2-aged stand will develop as large trees are removed through senescence and wind snap or by windthrow

#### D. UNIT DESIGN:

The buffers along Class III streams will be protected by the multi-cohort stand structure remaining after harvest.



## CRANE and ROWAN MOUNTAIN UNIT PLAN

**VCU-UNIT.ALT** 421-51.3

Management Prescription: Timber Production

Acres Even Aged: 13

Natural Stand Condition: Understory Reinitiation

Acres 2-Aged: 44

Desired Future Condition Even aged, 2-aged mixture

Acres Uneven Aged 0

Volume(MBF) 1272.8

USGS 1/4 QUAD MAP #: PTA D1 SE

Aerial Photo: 77

Flight# 9

Photo# 145

### I. RESOURCE CONCERNS/OPPORTUNITIES - UNIT MANAGEMENT OBJECTIVES

Class III streams on east and west sides of unit - maintain stream channel stability.

Class IV stream within unit - provide - maintain stream channel stability.

Southwest winds predominate - incorporate disturbance ecology principles.

Wildlife Habitat - Maintain legacy structure in unit where possible for prey species habitat through alternative silvicultural prescription.

### II. IMPLEMENTATION ACTIVITIES

#### A. ECOSYSTEMS MANAGEMENT:

##### 1. Vegetation:

Stand is of wind origin and is in understory reinitiation stage.

##### 2. Aquatic Habitat:

No Class I/II streams in Unit.

Class III: No programmed commercial timber harvest within the V-notch (side-slope break). Manage an appropriate distance beyond the slope break for windfirmness. (BMP 12.6 Riparian Area Designation and Protection; BMP 13.16 Stream Channel Protection) The unit is designed to avoid the Class III to the east. Both streams are in the High Gradient Contained Process Group. Manage the area within 120 feet from the top of the V-notch for windfirmness. Both buffers may be exposed to wind because there is evidence in the area of both SE and SW wind.

Class IV: Provide adequate deflection to minimize soil disturbance by using tailtrees on ridge adjacent to the stream. Partially suspend logs over the stream. (BMP 13.16 Stream Channel Protection)

##### 3. Wildlife Habitat:

Retain multi-cohort stand structure and legacy to provide necessary habitat characteristics for forest dwelling species. Part of the unit will be harvested using alternative silvicultural prescriptions. This should exceed TLMP S&Gs.

##### 4. Visuals:

#### B. TRANSPORTATION SYSTEM:

Specified road 46360 runs to the last landing (the eastern setting). It will continue past this unit in the future. The specified road will be put into "storage" after harvest is complete. All drainage structures will be removed to restore natural drainage patterns. Additional waterbars will be added as needed, and all areas of exposed soil will be grass seeded.

#### C. SILVICULTURAL PRESCRIPTION SUMMARY:

(a) Clearcut for natural regeneration, use downhill cable yarding, manage as even-aged stand, certify regeneration, pre-commercial thin to increase diameter growth and to provide light for shrubs and forbs. (b) Seed Tree with Reserves using cable yarding, use upper and lower diameter limit Rx for hemlock and cedar. Reserve and paint 2 large spruce every 10 acres. Initial managed stand will have 3 cohorts; 1) Young trees from regeneration harvest. 2) Small residuals left from lower dia. limit harvest 3) Large residual trees with high wildlife value. Over time, it is expected that a 2-aged stand will develop as large trees are removed through senescence and wind snap or by windthrow

#### D. UNIT DESIGN:

The buffers along Class III streams will be protected by the multi-cohort stand structure remaining after harvest.





## CRANE and ROWAN MOUNTAIN UNIT PLAN

**VCU-UNIT.ALT** 421-51.4

Management Prescription: Timber Production

Acres Even Aged: 13

Natural Stand Condition: Understory Reinitiation

Acres 2-Aged: 44

Desired Future Condition Even aged, 2-aged mixture

Acres Uneven Aged 0

Volume(MBF) 1272.8

USGS 1/4 QUAD MAP #: PTA D1 SE

Aerial Photo: 77

Flight# 9

Photo#

145

### I. RESOURCE CONCERNS/OPPORTUNITIES - UNIT MANAGEMENT OBJECTIVES

Class III streams on east and west sides of unit - maintain stream channel stability.

Class IV stream within unit - provide - maintain stream channel stability.

Southwest winds predominate - incorporate disturbance ecology principles.

Wildlife Habitat - Maintain legacy structure in unit where possible for prey species habitat through alternative silvicultural prescription.

### II. IMPLEMENTATION ACTIVITIES

#### A. ECOSYSTEMS MANAGEMENT:

##### 1. Vegetation:

Stand is of wind origin and is in understory reinitiation stage.

##### 2. Aquatic Habitat:

No Class I/II streams in Unit.

Class III: No programmed commercial timber harvest within the V-notch (side-slope break). Manage an appropriate distance beyond the slope break for windfirmness. (BMP 12.6 Riparian Area Designation and Protection; BMP 13.16 Stream Channel Protection) The unit is designed to avoid the Class III to the east. Both streams are in the High Gradient Contained Process Group. Manage the area within 120 feet from the top of the V-notch for windfirmness. Both buffers may be exposed to wind because there is evidence in the area of both SE and SW wind.

Class IV: Provide adequate deflection to minimize soil disturbance by using tailtrees on ridge adjacent to the stream.

Partially suspend logs over the stream. (BMP 13.16 Stream Channel Protection)

##### 3. Wildlife Habitat:

Retain multi-cohort stand structure and legacy to provide necessary habitat characteristics for forest dwelling species. Part of the unit will be harvested using alternative silvicultural prescriptions. This should exceed TLMP S&Gs.

##### 4. Visuals:

#### B. TRANSPORTATION SYSTEM:

Specified road 46360 runs to the last landing (the eastern setting). It will continue past this unit in the future. The specified road will be put into "storage" after harvest is complete. All drainage structures will be removed to restore natural drainage patterns. Additional waterbars will be added as needed, and all areas of exposed soil will be grass seeded.

#### C. SILVICULTURAL PRESCRIPTION SUMMARY:

(a) Clearcut for natural regeneration, use downhill cable yarding, manage as even-aged stand, certify regeneration, pre-commercial thin to increase diameter growth and to provide light for shrubs and forbs. (b) Seed Tree with Reserves using cable yarding, use upper and lower diameter limit Rx for hemlock and cedar. Reserve and paint 2 large spruce every 10 acres. Initial managed stand will have 3 cohorts; 1) Young trees from regeneration harvest. 2) Small residuals left from lower dia. limit harvest 3) Large residual trees with high wildlife value. Over time, it is expected that a 2-aged stand will develop as large trees are removed through senescence and wind snap or by windthrow

#### D. UNIT DESIGN:

The extended buffers along Class III streams were designed to protect the steep v-notch. V-notch along east side of unit will have extended buffer to insure windfirmness.



# CRANE and ROWAN MOUNTAIN UNIT PLAN

VCU-UNIT.ALT 421-51.5

Management Prescription: Timber Production

Natural Stand Condition: Understory Reinitiation

Desired Future Condition: Even aged

Acres Even Aged: 57

Acres 2-Aged: 0

Acres Uneven Aged: 0

Volume(MBF) 1915.2

USGS 1/4 QUAD MAP #: PTA D1 SE

Aerial Photo: 77 Flight# 9 Photo# 145

## I. RESOURCE CONCERNS/OPPORTUNITIES - UNIT MANAGEMENT OBJECTIVES

- Class III streams on east and west sides of unit - maintain stream channel stability.
- Class IV stream within unit - provide - maintain stream channel stability.
- Southwest winds predominate - incorporate disturbance ecology principles.

## II. IMPLEMENTATION ACTIVITIES

### A. ECOSYSTEMS MANAGEMENT:

#### 1. Vegetation:

Stand is of wind origin and is in understory reinitiation stage.

#### 2. Aquatic Habitat:

No Class I/II streams in Unit.

Class III: No programmed commercial timber harvest within the V-notch (side-slope break). Manage an appropriate distance beyond the slope break for windfirmness. (BMP 12.6 Riparian Area Designation and Protection; BMP 13.16 Stream Channel Protection) The unit is designed to avoid the Class III to the east. Both streams are in the High Gradient Contained Process Group. Manage the area within 120 feet from the top of the V-notch for windfirmness. Both buffers may be exposed to wind because there is evidence in the area of both SE and SW wind.

Class IV: Provide adequate deflection to minimize soil disturbance by using tailtrees on ridge adjacent to the stream. Partially suspend logs over the stream. (BMP13.16 Stream Channel Protection)

#### 3. Wildlife Habitat:

Unit is in high/medium deer HSI value and high Marten HIS value. South facing slope below 1300 feet in elevation.

#### 4. Visuals:

### B. TRANSPORTATION SYSTEM:

Specified road 46360 runs to the last landing (the eastern setting). It will continue past this unit in the future. The specified road will be put into "storage" after harvest is complete. All drainage structures will be removed to restore natural drainage patterns. Additional waterbars will be added as needed, and all areas of exposed soil will be grass seeded.

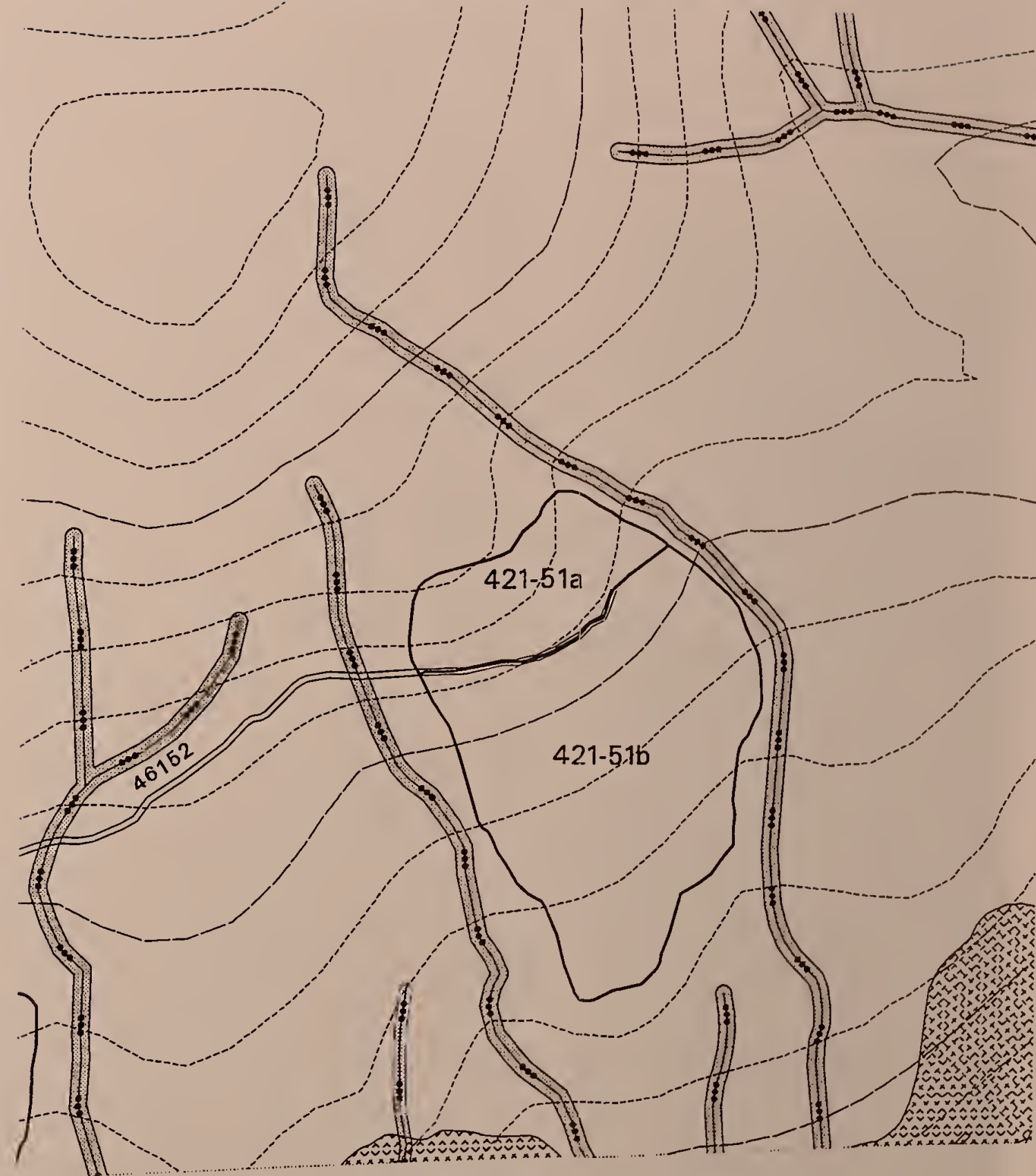
### C. SILVICULTURAL PRESCRIPTION SUMMARY:

(a) Clearcut for natural regeneration, use downhill cable yarding, manage as even-aged stand, certify regeneration, pre-commercial thin to increase diameter growth and to provide light for shrubs and forbs. (b) is same as (a) with uphill cable yarding system.

### D. UNIT DESIGN:

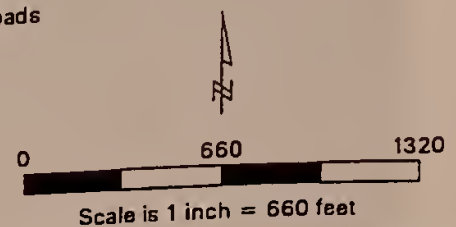
The extended buffers along Class III streams were designed to protect the steep v-notch. V-notch along east side of unit will have extended buffer to insure windfirmness.

## Crane/Rowan Timber Harvest Unit 421-51



- Proposed Unit Boundaries
- Non-NF Lands
- Existing and Planned Managed Stands
- Riparian Management Area
- AHMU-Class 1 Streams
- AHMU-Class 2 Streams
- AHMU-Class 3 Streams
- AHMU-Class 4 Streams

- Existing Forest Development Roads
- Existing Closed Roads
- Proposed Forest Development Roads
- Proposed Temporary Roads
- 500-ft. Contour Interval
- 100-ft. Contour Interval




















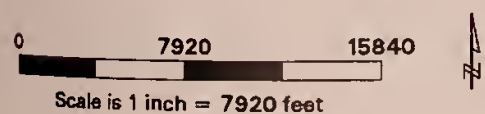
# Legend

-  Active Maintenance, All Vehicle Road
-  Stormproofed, High Clearance Road
-  Closed Roads in Storage
-  Obliterated Road Removed from Transportation System
-  Shoreline, Lakes, Class I/II Streams
-  Existing Clearcut Harvest Units
-  Existing Partial Cut Harvest Units
-  Crane/Rowen Proposed Units
-  Non Timber LUDs
-  Non-National Forest Lands
-  Log Transfer Facility (LTF)

## Road Management Objectives Maintenance Strategy



STIKINE AREA VICINITY MAP  
MAP AREA SHOWN IN DARK GREY



k:\projects\crane\_rowen\plots\docmaps\obmLmap  
obmLamLam1 12/23/97

Crane/Rowen Mountain Timber Harvest  
Draft EIS







# Road Management Objectives

Project Crane and Rowan Mountain		System Kuiu	Land Use Designation TM
Route No 6401	Route Name Bull Buck	Begin Termini MP 8.24 ROAD 6402	End Termini SECTION 4
Begin MP 0	Length 1.03	Status Existing	

## General Design Criteria

Functional Class L	Service Life LI	Traffic Service Level D	Surface IMP	Width 14	Design Speed 10	Critical Vehicle log truck	Design Vehicle log truck
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### Intended Purpose/Future Use

Access for silvicultural activities. Will be extended in the future to access timber in the valley to the south. Close road to minimize wildlife displacement and reduce maintenance needs.

## Maintenance Criteria

Operational Maintenance Level (Current or Planned Initial Condition)	3	Objective Maintenance Level (Desired Future Condition)	1
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### Maintenance Narrative

Storage: remove or bypass all drainage structures to restore natural drainage patterns, add waterbars as needed to control runoff, re-vegetate. No fish timing req'd. to remove cmp at MP 0.25 Class II x-ing.

## Operation Criteria

Highway Safety Act:	No	Jurisdiction:	National Forest ownership
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### Travel Management Strategies

Encourage: N/A

Accept: Hikers, bicycles

Discourage: Motorized vehicles

Prohibit: N/A

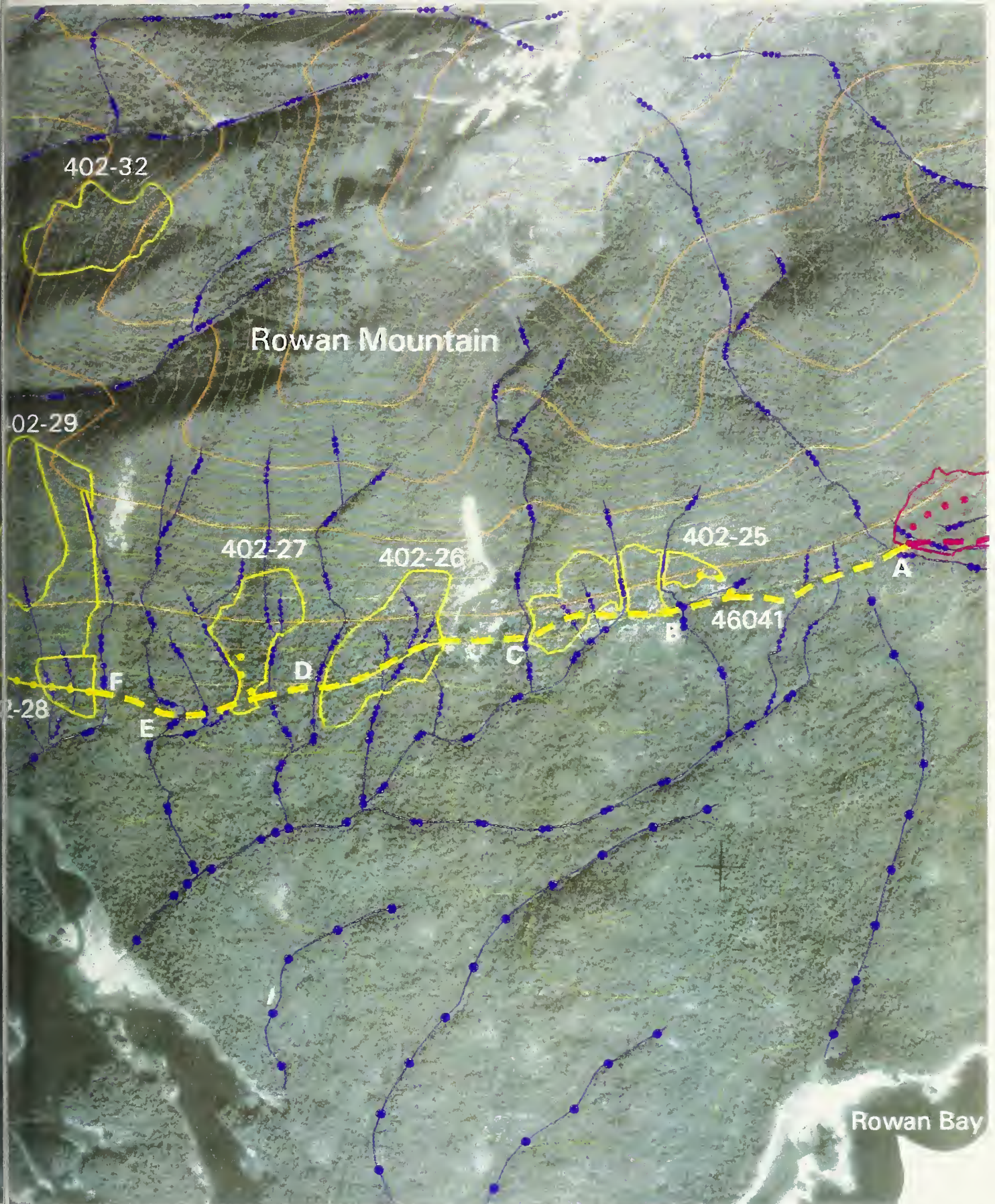
Eliminate: Standard passenger and high clearance vehicles.

### Travel Management Narrative

By removing crossing structures, most motorized vehicle use will be eliminated. Determined individuals may find a way to use off road vehicles on this road, but will be discouraged by the difficulty. Restore crossings when needed in the future.

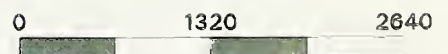






RMO46041A

Contour Interval 100 ft



Scale is 1 inch = 1320 feet





# Road Management Objectives

Project	Crane and Rowan Mountain	System	Kuiu	Land Use Designation	TM
Route No	46041	Route Name	Behind Camp	Begin Termini	MP 1.36 ROAD 6404
				End Termini	Almost to Unit 402-24 N&E Kuiu
Begin MP	0	Length	0.59	Status	Existing

## General Design Criteria

Functional Class	Service Life	Traffic Service Level	Surface	Width	Design Speed	Critical Vehicle	Design Vehicle
L	LI	D	IMP	14	10	log truck	log truck

Intended Purpose/Future Use  
Access for general forest management and administration. Will be extended in the Rowan Release T.S.

## Maintenance Criteria

Operational Maintenance Level (Current or Planned Initial Condition)  Objective Maintenance Level (Desired Future Condition)

Maintenance Narrative  
Storm Proof: provide waterbars, rolling dips, outsloping, etc., to assure controlled runoff until any needed maintenance can be performed on the primary drainage system. Control roadside brush to maintain passage.

## Operation Criteria

Highway Safety Act:  Jurisdiction: National Forest ownership

### Travel Management Strategies

Encourage: N/A

Accept: High clearance vehicles, ATV's

Discourage: Standard passenger vehicles

Prohibit: N/A

Eliminate: N/A

Travel Management Narrative  
Public travel on this isolated system is very low. Only access is by barging private vehicles. Rough rock ramp at LTF discourages passenger vehicles. Public traffic is not expected to conflict with commercial use.





# Road Management Objectives

Project Crane and Rowan Mountain		System Kuiu	Land Use Designation TM
Route No. 46041	Route Name Behind Camp	Begin Termini MP 0.59 existing Rd. 46041	End Termini Camp Creek crossing
Begin MP 0.59	Length 0.49	Status Planned	

## General Design Criteria

Functional Class L	Service Life LI	Traffic Service Level D	Surface IMP	Width 14	Design Speed 10	Critical Vehicle log truck	Design Vehicle log truck
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Intended Purpose/Future Use  
Access for general forest management and administration. Allows standard motorized access to within ~2 miles of the end of the road system. To be built in the Rowan Release T.S.

## Maintenance Criteria

Operational Maintenance Level (Current or Planned Initial Condition)	2	Objective Maintenance Level (Desired Future Condition)	2
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### Maintenance Narrative

Storm Proof: provide waterbars, rolling dips, outsloping, etc., to assure controlled runoff until any needed maintenance can be performed on the primary drainage system. Control roadside brush to maintain passage.

## Operation Criteria

Highway Safety Act:	No	Jurisdiction:	National Forest ownership
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### Travel Management Strategies

Encourage: N/A

Accept: High clearance vehicles, ATV's

Discourage: Standard passenger vehicles

Prohibit: N/A

Eliminate: N/A

### Travel Management Narrative

Public travel on this isolated system is very low. Only access is by barging private vehicles. Rough rock ramp at LTF discourages passenger vehicles. Public traffic is not expected to conflict with commercial use.



# Road Management Objectives

Project Crane and Rowan Mountain		System Kuiu	Land Use Designation TM
Route No 46041	Route Name Behind Camp	Begin Termini MP 1.08 of Planned 46041	End Termini East boundary Unit 402-28
Begin MP 1.08	Length 1.62	Status Opportunity	

## General Design Criteria

Functional Class L	Service Life LI	Traffic Service Level D	Surface IMP	Width 14	Design Speed 10	Critical Vehicle log truck	Design Vehicle log truck
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### Intended Purpose/Future Use

Access for silvicultural activities. Will not be extended in the future, but additional timber sale opportunities exist along the road. Close road after sale to minimize wildlife displacement and reduce maintenance needs.

## Maintenance Criteria

Operational Maintenance Level (Current or Planned Initial Condition)  Objective Maintenance Level (Desired Future Condition)

### Maintenance Narrative

Storage: remove or bypass all drainage structures to restore natural drainage patterns, add waterbars as needed to control runoff, re-vegetate.

## Operation Criteria

Highway Safety Act:  Jurisdiction: National Forest ownership.

### Travel Management Strategies

Encourage: N/A

Accept: Hikers, bicycles

Discourage: Motorized vehicles

Prohibit: N/A

Eliminate: Standard passenger and high clearance vehicles

### Travel Management Narrative

By removing crossing structures, most motorized vehicle use will be eliminated. Determined individuals may find a way to use off road vehicles on this road, but will be discouraged by the difficulty. Restore crossings when needed in the future.





# Road Management Objectives

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## Site Specific Design Criteria Road 46041

**ROAD LOCATION:** The main location objective is to follow the base of the Rowan Mountain ridge system, staying below the steep slopes, but above the forested wetlands when possible. Between Units 402-27 and 28 the road climbs up to reach a bench along the bottom of Unit 402-28. Climbing here avoids an alluvial area, then steep sideslopes (BMP 14.2). It also keeps the road above the 1000 foot beach buffer. The specified road ends just past the last crossing that requires design (Site F). The remaining 0.66 miles to the helicopter/cable landing in Unit 402-49 will be built as a temporary spur.

**WETLANDS:** The first half mile of the new construction crosses along the edge of a soil type mapped as muskeg/forested mosaic (BMP 12.5). The road is located here because construction on the gentle terrain will cause less environmental impacts than building on the steep sideslopes of Rowan Mountain.

**EROSION CONTROL:** An erosion control plan for construction and maintenance will be developed by the contractor and approved by the Contracting Officer (BMP 14.5). All areas of organic or mineral soil exposed during construction shall be grass seeded and fertilized (BMP 12.17,14.8)

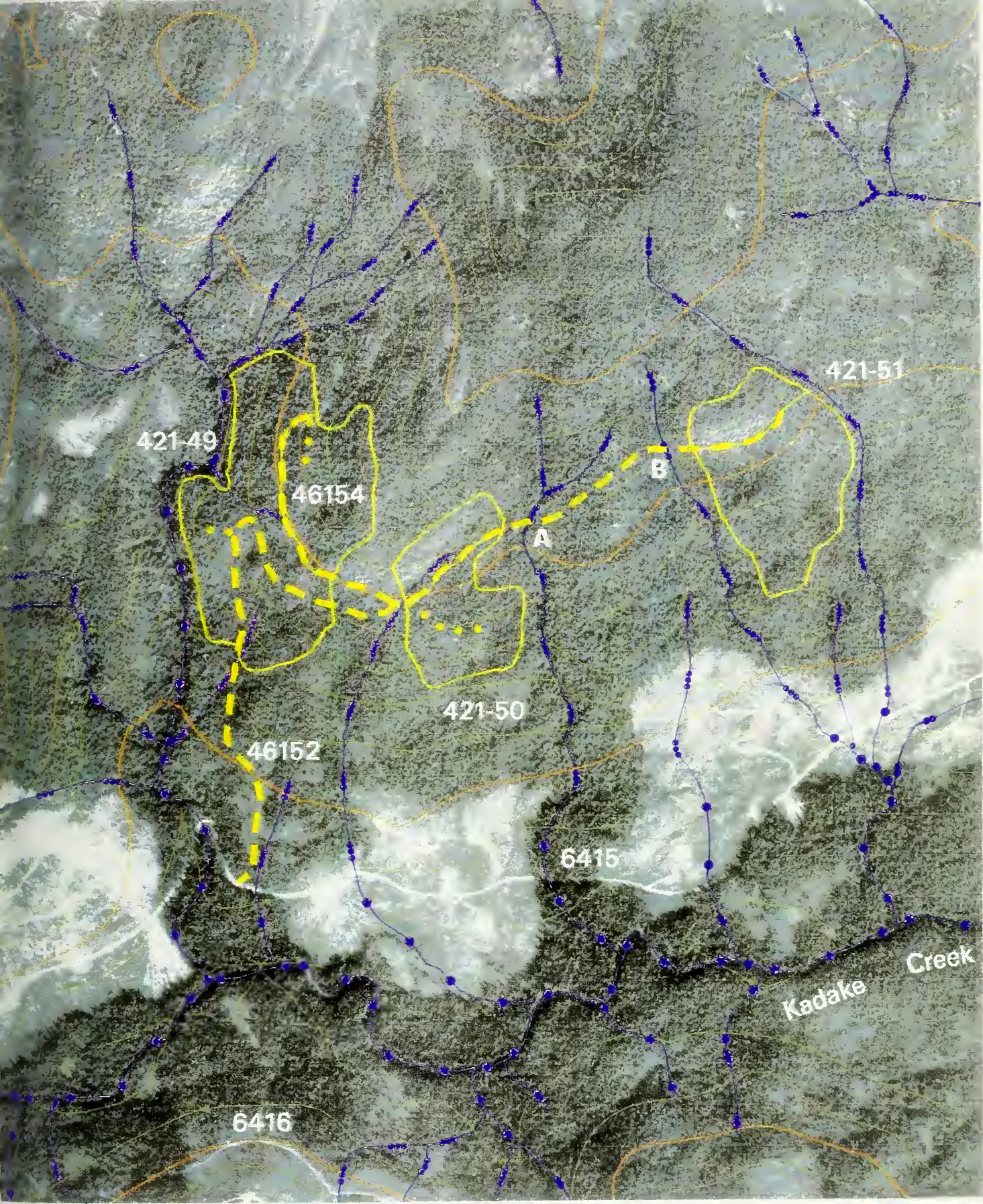
**ROCK PITS:** During periods of high rainfall (as defined in current Regional specifications), blasting operations will be suspended at quarries near potentially unstable sites where ground vibration may induce mass movement (BMP 14.6). The area along the temporary spur between Units 402-28 and 49 has been identified as a visual or recreation concern. Quarries will not be located in this area.

### STREAM CROSSINGS:

- A) MP 1.12 AHMU 3 Channel Type HC2 BF Width 30 ft BF Depth 1 ft Incision 5-10 ft  
Substrate boulder, cobble, gravel Gradient 10% Structure 60' bridge Narrative: ~200 below bedrock falls, flashy stream, log jams above and below crossing. This is the main channel of the creek formerly used for the Rowan Bay logging camp's water supply. Located west end Unit 402-24. (Camp)
- B) MP 1.55 AHMU 2 Channel Type MM1 BF Width 4 ft BF Depth 1 ft Incision 3 ft  
Substrate silty gravel Gradient 1% Structure 36" cmp Narrative: Inlet near confluence of two smaller channels. No timing required, maintain fish passage. Located east end Unit 402-25. (Mugwump)
- C) MP 1.87 AHMU 3 Channel Type HC6 BF Width 12 ft BF Depth 2 ft Incision 10 ft  
Substrate bedrock, boulders, cobbles Gradient 6% Structure 12 m panel bridge Narrative: Rock chute w/18% gradient into crossing, 40' of 6% and cobbles, then a 10' falls below the site. Bedrock banks. Located west end of Unit 402-25. (Peterson)
- D) MP 2.29 AHMU 3 Channel Type HC3 BF Width 10 ft BF Depth 2 ft Incision 10 ft  
Substrate boulders, cobbles, gravel Gradient 10% up/15% down Structure 12 m panel bridge  
Narrative: Dry wash, 30' across at top of banks. Located west end of Unit 402-26. (Algor)
- E) MP 2.55 AHMU 3 Channel Type AF2/HC3 break BF Width 10 ft BF Depth 1.5 ft Incision 1.5 ft  
Substrate boulders, cobbles, gravel Gradient 4% Structure 60" cmp Narrative: Dry wash debris torrent deposit. Large fill will be required to hit the ridge nose on the west side of the crossing. Located between Unit 402-27 and 28. (Ramp)
- F) MP 2.72 AHMU 2 Channel Type HC3 BF Width 10 ft BF Depth 1 ft Incision 30 ft  
Substrate bedrock, boulders, cobbles Gradient 20% Structure 80' bridge Narrative: Old debris torrent down this V-notch, 40 yr. old spruce and alder on east side. Goes to AHMU 3 ~100 above crossing, no timing requirements. 75 ft across to good level sill locations, probably cut down approaches to make bridge fit. Located east boundary of Unit 402-28. (Torrent)

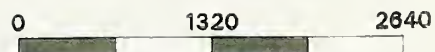






RMO46152

Contour Interval 100 ft



Scale is 1 inch = 1320 feet







# Road Management Objectives

Project Crane and Rowan Mountain		System Kuiu	Land Use Designation TM
Route No 46152	Route Name Kadake Wind	Begin Termini MP 5.86 Road 6415	End Termini Last landing Unit 421-51
Begin MP 0	Length 2.04	Status Opportunity	

## General Design Criteria

Functional Class L	Service Life LI	Traffic Service Level D	Surface IMP	Width 14	Design Speed 10	Critical Vehicle log truck	Design Vehicle log truck
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Intended Purpose/Future Use  
Access for silvicultural activities. Will be extended in the future, accessing timber along the slope to the east. Close road after sale to minimize wildlife displacement and reduce maintenance needs

## Maintenance Criteria

Operational Maintenance Level (Current or Planned Initial Condition)  Objective Maintenance Level (Desired Future Condition)

Maintenance Narrative  
Storage: remove or bypass all drainage structures to restore natural drainage patterns, add waterbars as needed to control runoff, re-vegetate.

## Operation Criteria

Highway Safety Act:  Jurisdiction: National Forest ownership

### Travel Management Strategies

Encourage: N/A

Accept: Hikers, bicycles

Discourage: Motorized vehicles

Prohibit: N/A

Eliminate: Standard passenger and high clearance vehicles.

Travel Management Narrative  
By removing crossing structures, most motorized vehicle use will be eliminated. Determined individuals may find a way to use off road vehicles on this road, but will be discouraged by the difficulty. Restore crossings when needed in the future.



# Road Management Objectives

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## Site Specific Design Criteria

### Road 46152

**ROAD LOCATION:** The road gains elevation as rapidly as possible up gentle topography, then switches back and accesses the top of a mid-slope bench. There is one V-notch control point just east of Unit 421-50.

**WETLANDS:** The first 1500' past the junction with Rd. 6415 crosses through a soil type mapped as muskeg/forested mosaic (BMP 12.5). The road is located here because the ground is gaining elevation the steadiest along this route. Moving the road down into the timber to the west would have affected the stream buffer and caused a very steep grade to make up the elevation lost. Between Units 421-50 and 51 there is another 1500' segment that crosses a muskeg/forested mosaic soil type. This is a good bench location which avoids impacts to steeper slopes off of the forested wetland.

**EROSION CONTROL:** An erosion control plan for construction and maintenance will be developed by the contractor and approved by the Contracting Officer (BMP 14.5). All areas of organic or mineral soil exposed during construction shall be grass seeded and fertilized (BMP 12.17,14.8)

**ROCK PITS:** During periods of high rainfall (as defined in current Regional specifications), blasting operations will be suspended at quarries near potentially unstable sites where ground vibration may induce mass movement (BMP 14.6). No visual concerns along this location.

#### STREAM CROSSINGS:

- A) MP 1.47 AHMU 3 Channel Type HC6 BF Width 8 ft BF Depth 1.5 ft Incision 15-20 ft  
Substrate bedrock, cobble Gradient 20% up/5% down Structure 48" cmp Narrative: Road grade is 15% through the crossing. Located just past east boundary Unit 420-50.
- B) MP 1.78 AHMU 3 Channel Type HC6 BF Width 6 ft BF Depth 1.5 ft Incision 20 ft  
Substrate boulder, cobble Gradient 15% Structure 48" cmp Narrative: Located just before west boundary of Unit 420-51.





# Road Management Objectives

Project	Crane and Rowan Mountain	System	Kuiu	Land Use Designation	TM
Route No	46154	Route Name	Kadake Wind Switchback	Begin Termini	MP 1.15 Road 46152
				End Termini	North end Unit 421-49
Begin MP	0	Length	0.51	Status	Opportunity

## General Design Criteria

Functional Class	Service Life	Traffic Service Level	Surface	Width	Design Speed	Critical Vehicle	Design Vehicle
L	LI	D	IMP	14	10	log truck	log truck

### Intended Purpose/Future Use

Access for silvicultural activities. Will be extended in the future to access timber along the upper slope of the valley to the northwest, and possibly along the ridgetop. Close road to minimize wildlife displacement and reduce maintenance needs.

## Maintenance Criteria

Operational Maintenance Level (Current or Planned Initial Condition)	2	Objective Maintenance Level (Desired Future Condition)	1
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### Maintenance Narrative

Storage: remove or bypass all drainage structures to restore natural drainage patterns, add waterbars as needed to control runoff, re-vegetate.

## Operation Criteria

Highway Safety Act:	No	Jurisdiction:	National Forest ownership
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### Travel Management Strategies

Encourage: N/A

Accept: Hikers, bicycles

Discourage: Motorized vehicles

Prohibit: N/A

Eliminate: Standard passenger and high clearance vehicles.

### Travel Management Narrative

By removing crossing structures, most motorized vehicle use will be eliminated. Determined individuals may find a way to use off road vehicles on this road, but will be discouraged by the difficulty. Restore crossings when needed in the future.



# Road Management Objectives

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## Site Specific Design Criteria

### Road 46154

**ROAD LOCATION:** Road 46154 takes off with a switchback junction from MP 1.15 of Rd. 46152 (also proposed in this project). The switchback is on 20% sideslopes with the control being the curve must start before the Class 4 stream on the west boundary of Unit 420-50. The road then climbs to a bench running through the north portion of Unit 420-49. The road can continue on up the valley along this slope break in the future.

**WETLANDS:** The road crosses no mapped wetlands (BMP 12.5)..

**EROSION CONTROL:** An erosion control plan for construction and maintenance will be developed by the contractor and approved by the Contracting Officer (BMP 14.5). All areas of organic or mineral soil exposed during construction shall be grass seeded and fertilized (BMP 12.17,14.8)

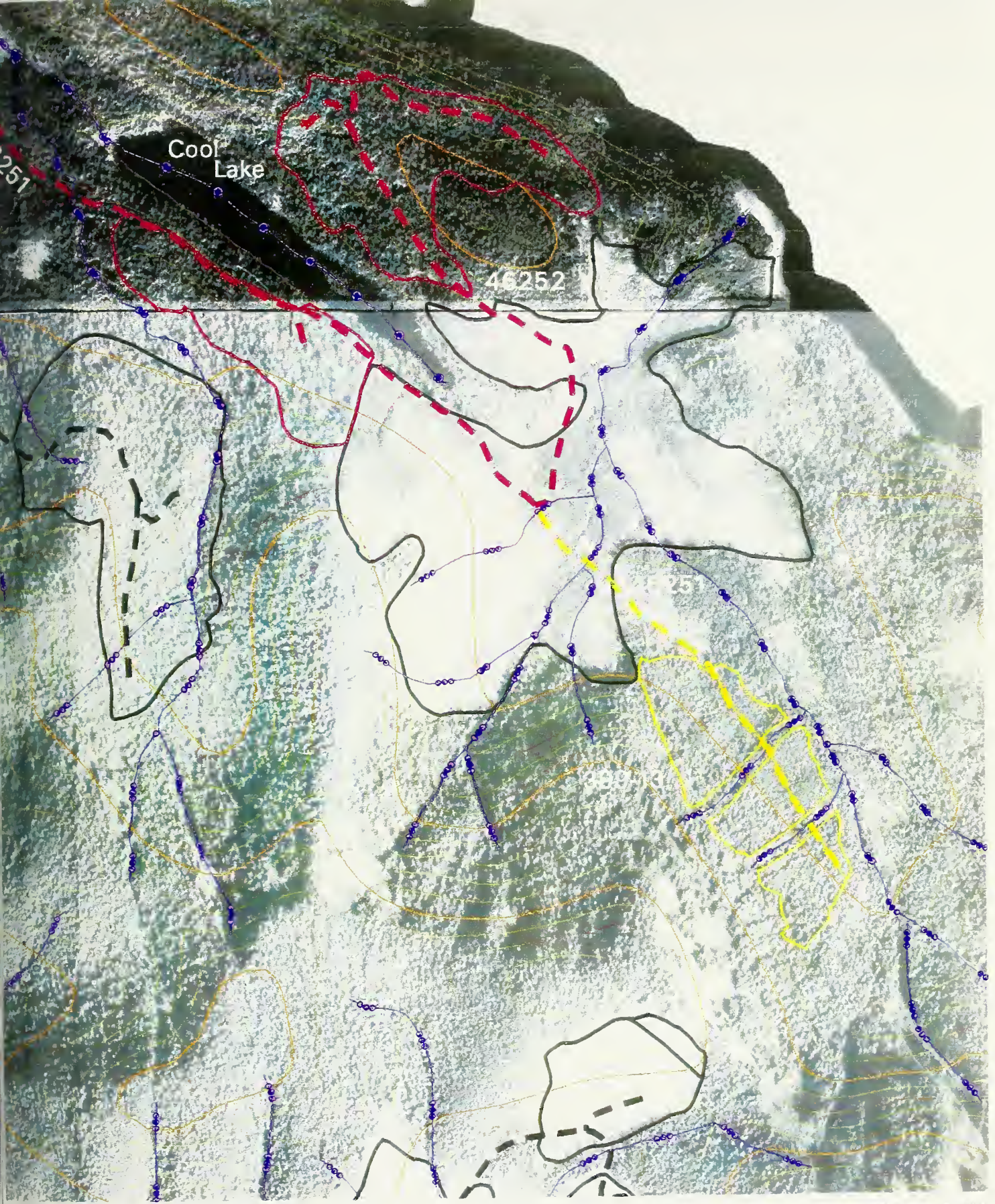
**ROCK PITS:** During periods of high rainfall (as defined in current Regional specifications), blasting operations will be suspended at quarries near potentially unstable sites where ground vibration may induce mass movement (BMP 14.6). There are no visual concerns along this route.

### STREAM CROSSINGS:

**Narrative:** There are no stream crossings that require site specific design consideration for volume of flow, fish habitat, or other design complexity.







Contour Interval 100 ft

RMO46251

Existing Roads  
Planned Roads  
NEPA Cleared Units  
Harvest Unit Boundary

0 1320 2640  
Scale is 1 inch = 1320 feet





# Road Management Objectives

Project Crane and Rowan Mountain		System Kuiu	Land Use Designation TM
Route No 46251	Route Name Cool Lake	Begin Termini MP 4.76 of Rd. 6425	End Termini Class II stream MP 1.02
Begin MP 0	Length 1.02	Status Planned	

## General Design Criteria

Functional Class L	Service Life LI	Traffic Service Level D	Surface IMP	Width 14	Design Speed 10	Critical Vehicle log truck	Design Vehicle log truck
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### Intended Purpose/Future Use

Access for general forest management and administration. Allows standard motorized access to within ~2 miles of the end of the road system. To be built in Saginaw T.S.

## Maintenance Criteria

Operational Maintenance Level (Current or Planned Initial Condition)	2	Objective Maintenance Level (Desired Future Condition)	2
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### Maintenance Narrative

Storm Proof: provide waterbars, rolling dips, outsloping, etc., to assure controlled runoff until any needed maintenance can be performed on the primary drainage system. Control roadside brush to maintain passage.

## Operation Criteria

Highway Safety Act:	No	Jurisdiction:	National Forest ownership
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### Travel Management Strategies

Encourage: N/A

Accept: High clearance vehicles, ATV's

Discourage: Standard passenger vehicles

Prohibit: N/A

Eliminate: N/A

### Travel Management Narrative

Public travel on this isolated system is very low. Only access is by barging private vehicles. Rough rock ramp at LTF discourages passenger vehicles. Public traffic is not expected to conflict with commercial use.





# Road Management Objectives

Project Crane and Rowan Mountain		System Kuiu	Land Use Designation TM
Route No 46251	Route Name Cool Lake	Begin Termini MP 1.02 of Planned 46251	End Termini Jnct. planned Rd. 46152
Begin MP 1.02	Length 1.11	Status Planned	

## General Design Criteria

Functional Class L	Service Life LI	Traffic Service Level D	Surface IMP	Width 14	Design Speed 10	Critical Vehicle log truck	Design Vehicle log truck
-----------------------	--------------------	----------------------------	----------------	-------------	--------------------	-------------------------------	-----------------------------

### Intended Purpose/Future Use

Access for silvicultural activities. Close road to minimize wildlife displacement and reduce maintenance needs. To be built in Saginaw T.S.

## Maintenance Criteria

Operational Maintenance Level (Current or Planned Initial Condition)	2	Objective Maintenance Level (Desired Future Condition)	1
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### Maintenance Narrative

Storage: remove or bypass all drainage structures to restore natural drainage patterns, add waterbars as needed to control runoff, re-vegetate. No fish timing req'd when removing Class II x-ing at MP 1.02

## Operation Criteria

Highway Safety Act:	No	Jurisdiction:	National Forest ownership
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### Travel Management Strategies

Encourage: N/A

Accept: Hikers, bicycles

Discourage: Motorized vehicles

Prohibit: N/A

Eliminate: Standard passenger and high clearance vehicles.

### Travel Management Narrative

By removing crossing structures, most motorized vehicle use will be eliminated. Determined individuals may find a way to use off road vehicles on this road, but will be discouraged by the difficulty. Restore crossings when needed in the future.



# Road Management Objectives

Project	System	Land Use Designation	
Crane and Rowan Mountain	Kuiu	TM	
Route No	Route Name	Begin Termini	End Termini
46251	Cool Lake	MP 2.13 of Planned 46251	Last landing Unit 399-13
Begin MP	Length	Status	
2.13	0.94	Opportunity	

## General Design Criteria

Functional Class	Service Life	Traffic Service Level	Surface	Width	Design Speed	Critical Vehicle	Design Vehicle
L	LI	D	IMP	14	10	log truck	log truck

### Intended Purpose/Future Use

Access for silvicultural activities. Will be extended in the future, crossing the creek and accessing timber up the valley to the west. Close road after sale to minimize wildlife displacement and reduce maintenance needs.

## Maintenance Criteria

Operational Maintenance Level (Current or Planned Initial Condition)	Objective Maintenance Level (Desired Future Condition)
2	1

### Maintenance Narrative

Storage: remove or bypass all drainage structures to restore natural drainage patterns, add waterbars as needed to control runoff, re-vegetate.

## Operation Criteria

Highway Safety Act:	Jurisdiction:
No	National Forest ownership

### Travel Management Strategies

Encourage: N/A

Accept: Hikers, bicycles

Discourage: Motorized vehicles

Prohibit: N/A

Eliminate: Standard passenger and high clearance vehicles.

### Travel Management Narrative

By removing crossing structures, most motorized vehicle use will be eliminated. Determined individuals may find a way to use off road vehicles on this road, but will be discouraged by the difficulty. Restore crossings when needed in the future.





# Road Management Objectives

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## Site Specific Design Criteria Road 46251

ROAD LOCATION: Road 46251 will be constructed to MP 2.13 in the Saginaw T.S. New construction continues to the southeast through an existing managed stand, where the road crosses the only stream that needs a designed crossing structure (Site A). At the edge of the managed stand, the road begins to run along toe of a forested slope, which is the location objective through Unit 399-13.

WETLANDS: The first 1300' of the new construction past the managed stand crosses along the upper edge of a soil type mapped as muskeg/forested mosaic (BMP 12.5). The road is located here because construction on the gentle terrain will cause less environmental impacts than building on the steeper forested sideslopes.

EROSION CONTROL: An erosion control plan for construction and maintenance will be developed by the contractor and approved by the Contracting Officer (BMP 14.5). All areas of organic or mineral soil exposed during construction shall be grass seeded and fertilized (BMP 12.17,14.8)

ROCK PITS: During periods of high rainfall (as defined in current Regional specifications), blasting operations will be suspended at quarries near potentially unstable sites where ground vibration may induce mass movement (BMP 14.6). There are no visual concerns along this route.

### STREAM CROSSINGS:

A) MP 2.25 AHMU 3 Channel Type HC5 BF Width 12 ft BF Depth 1.5 ft Incision 5 ft  
Substrate boulder, cobble Gradient 15% Structure 12 m panel bridge Narrative: Flashy stream moving a lot of bedload up to 1 ft. in diameter.



# Road Management Objectives

Project	Crane and Rowan Mountain	System	Kuiu	Land Use Designation	TM		
Route No	46252	Route Name	North Cool Lake	Begin Termini	MP 2.13 of Planned 46251	End Termini	West landing Unit 399-16
Begin MP	0	Length	1.1	Status	Planned		

## General Design Criteria

Functional Class	Service Life	Traffic Service Level	Surface	Width	Design Speed	Critical Vehicle	Design Vehicle
L	LI	D	IMP	14	10	log truck	log truck

### Intended Purpose/Future Use

Access for silvicultural activities. Will be extended in the future to the end of the ridge to the west. Close road to minimize wildlife displacement and reduce maintenance needs.

## Maintenance Criteria

Operational Maintenance Level (Current or Planned Initial Condition)	2	Objective Maintenance Level (Desired Future Condition)	1
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### Maintenance Narrative

Storage: remove or bypass all drainage structures to restore natural drainage patterns, add waterbars as needed to control runoff, re-vegetate.

## Operation Criteria

Highway Safety Act:	No	Jurisdiction:	National Forest ownership
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### Travel Management Strategies

Encourage: N/A

Accept: Hikers, bicycles

Discourage: Motorized vehicles

Prohibit: N/A

Eliminate: Standard passenger and high clearance vehicles.

### Travel Management Narrative

By removing crossing structures, most motorized vehicle use will be eliminated. Determined individuals may find a way to use off road vehicles on this road, but will be discouraged by the difficulty. Restore crossings when needed in the future.











# Road Management Objectives

Project	Crane and Rowan Mountain	System	Kuiu	Land Use Designation	TM
Route No	46360	Route Name	Pinnacles	Begin Termini	MP 3.43 ROAD 6428
				End Termini	Jnct. spur left at MP 2.34
Begin MP	0	Length	2.34	Status	Existing

## General Design Criteria

Functional Class	Service Life	Traffic Service Level	Surface	Width	Design Speed	Critical Vehicle	Design Vehicle
L	LI	D	IMP	14	10	log truck	log truck

### Intended Purpose/Future Use

Access for general forest management and administration. Allows standard motorized access to within ~2 miles of the end of the road system.

## Maintenance Criteria

Operational Maintenance Level (Current or Planned Initial Condition)	3	Objective Maintenance Level (Desired Future Condition)	2
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### Maintenance Narrative

Storm Proof: provide waterbars, rolling dips, outsloping, etc., to assure controlled runoff until any needed maintenance can be performed on the primary drainage system. Control roadside brush to maintain passage.

## Operation Criteria

Highway Safety Act:	No	Jurisdiction:	National Forest ownership
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### Travel Management Strategies

Encourage: N/A

Accept: High clearance vehicles, ATV's

Discourage: Standard passenger vehicles

Prohibit: N/A

Eliminate: N/A

### Travel Management Narrative

Public travel on this isolated system is very low. Only access is by barging private vehicles. Rough rock ramp at LTF discourages passenger vehicles. Public traffic is not expected to conflict with commercial use.





# Road Management Objectives

Project Crane and Rowan Mountain		System Kuiu	Land Use Designation TM
Route No 46360	Route Name Pinnacles	Begin Termini Junct spur left at MP 2.34	End Termini MP 3.20 SEIS unit 420-2
Begin MP 2.34	Length 0.86	Status Existing	

## General Design Criteria

Functional Class L	Service Life LI	Traffic Service Level D	Surface IMP	Width 14	Design Speed 10	Critical Vehicle log truck	Design Vehicle log truck
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Intended Purpose/Future Use  
Access for silvicultural activities. Close road to minimize wildlife displacement and reduce maintenance needs.

## Maintenance Criteria

Operational Maintenance Level (Current or Planned Initial Condition)  Objective Maintenance Level (Desired Future Condition)

Maintenance Narrative  
Storage: remove or bypass all drainage structures to restore natural drainage patterns, add waterbars as needed to control runoff, re-vegetate. Currently blocked by slump at MP 2.57.

## Operation Criteria

Highway Safety Act:  Jurisdiction: National Forest ownership

### Travel Management Strategies

Encourage: N/A

Accept: Hikers, bicycles

Discourage: Motorized vehicles

Prohibit: N/A

Eliminate: Standard passenger and high clearance vehicles.

Travel Management Narrative  
By removing crossing structures, most motorized vehicle use will be eliminated. Determined individuals may find a way to use off road vehicles on this road, but will be discouraged by the difficulty. Restore crossings when needed in the future.



# Road Management Objectives

Project Crane and Rowan Mountain		System Kuiu	Land Use Designation TM
Route No 46360	Route Name Pinnacles	Begin Termini MP 2.57 of existing 46360	End Termini North landing Unit 402-48
Begin MP 3.2	Length 1.48	Status Opportunity	

## General Design Criteria

Functional Class L	Service Life LI	Traffic Service Level D	Surface IMP	Width 14	Design Speed 10	Critical Vehicle log truck	Design Vehicle log truck
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### Intended Purpose/Future Use

Access for silvicultural activities. Will be extended in the future across the creek to the north for harvest up to the Kadake Bay Old Growth boundary. Close road to minimize wildlife displacement and reduce maintenance needs.

## Maintenance Criteria

Operational Maintenance Level (Current or Planned Initial Condition)	2	Objective Maintenance Level (Desired Future Condition)	1
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### Maintenance Narrative

Storage: remove or bypass all drainage structures to restore natural drainage patterns, add waterbars as needed to control runoff, re-vegetate.

## Operation Criteria

Highway Safety Act:	No	Jurisdiction:	National Forest ownership
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### Travel Management Strategies

Encourage: N/A

Accept: Hikers, bicycles

Discourage: Motorized vehicles

Prohibit: N/A

Eliminate: Standard passenger and high clearance vehicles.

### Travel Management Narrative

By removing crossing structures, most motorized vehicle use will be eliminated. Determined individuals may find a way to use off road vehicles on this road, but will be discouraged by the difficulty. Restore crossings when needed in the future.





# Road Management Objectives

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## Site Specific Design Criteria Road 46360

**ROAD LOCATION:** The main location objective is to follow the bench at ~800 elevation on the west side of Port Camden. It is believed that the bench is the top of a large "block glide" which resulted in a feature several hundred acres in size moving downslope. Geotech input indicates that due to the large scale of the feature the road along the top will not affect the stability of the area. The main control point is the head of a major V-notch that ends at the northeast corner of Unit 420-46.

**WETLANDS:** The road crosses 700 ft. of soiltype mapped as a forested wetland/upland mosaic between Units 420-46 and 420-47. Along the northeast corner of Unit 420-47, 500 ft. of forested wetland is crossed. (BMP 12.5). The road is located here because it is a good bench location and construction on the gentle terrain will cause less environmental impacts than building on the steeper non-wetland sideslopes.

**EROSION CONTROL:** An erosion control plan for construction and maintenance will be developed by the contractor and approved by the Contracting Officer (BMP 14.5). All areas of organic or mineral soil exposed during construction shall be grass seeded and fertilized (BMP 12.17,14.8)

**ROCK PITS:** During periods of high rainfall (as defined in current Regional specifications), blasting operations will be suspended at quarries near potentially unstable sites where ground vibration may induce mass movement (BMP 14.6). The entire length of this road has been identified as a visual or recreation concern. In addition, since the road is in an area of volcaniclastic soils, a soil scientist or geotech will be involved in the location of the quarry.

### STREAM CROSSINGS:

**Narrative:** There are no stream crossings that require site specific design consideration for volume of flow, fish habitat, or other design complexity. Two streams in Unit 420-46 go to very low gradient when they hit the bench in the middle of the unit. 36" cmp's will easily handle the flow of these streams.



# Appendix C



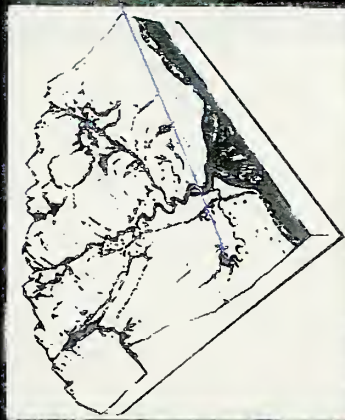
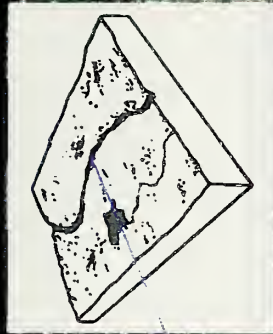


# **Appendix C**

## **Riparian Standards and Guidelines**



## PALUSTRINE PROCESS GROUP



### DESCRIPTION

Palustrine channels are associated with lowland landforms and wetlands. Channel gradients are less than 1 percent. Palustrine channels are singular and sinuous. Stream flow is dependent on peatland and lowland runoff. Sediment storage is the dominant process. Substrate material ranges from fine organic material to coarse gravel. Riparian vegetation includes mixed conifer, shore pine, and non-forest. Site-potential tree height is generally less than 85'.

### STREAM CLASS / ACTIVITY

#### I & II (direct)/Timber Harvest

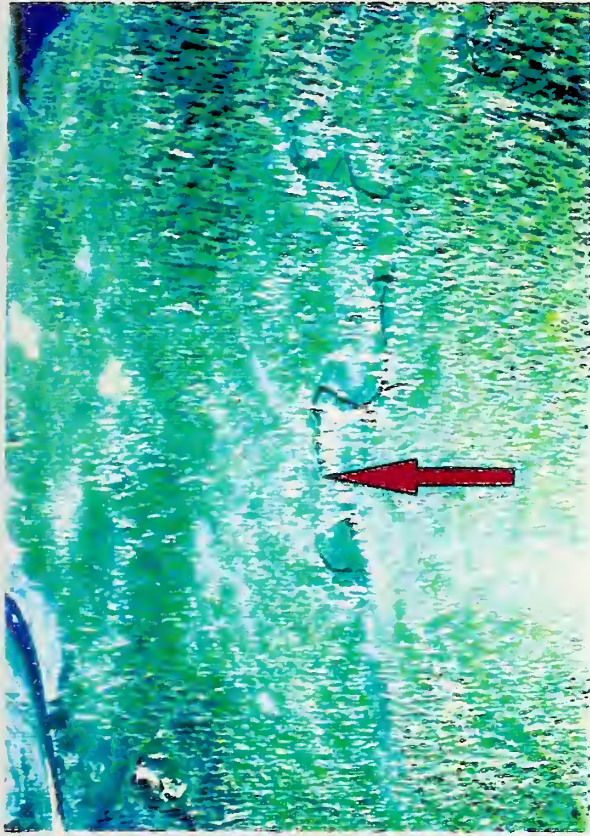
No commercial timber harvest within 100 feet of class I streams and class II streams that flow directly into class I streams. No programmed commercial timber harvest in the Riparian Management Area (greatest of floodplain, riparian vegetation or soils or riparian associated wetland fens). Manage an appropriate distance beyond the no-harvest zone to provide for a reasonable assurance of windfirmness of the Riparian Management Area (pay special attention to the area within one site-potential tree height of the Riparian Management Area).

#### II (non-direct)/Timber Harvest

No programmed commercial timber harvest in the Riparian Management Area (greatest of floodplain, riparian vegetation or soils or riparian associated wetland fens). Manage an appropriate distance beyond the no-harvest zone to provide for a reasonable assurance of windfirmness of the Riparian Management Area (pay special attention to the area within one site-potential tree height of the Riparian Management Area).

#### III/Timber Harvest

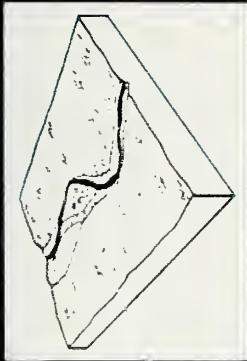
Consider no harvest (or limited harvest) areas to benefit water quality or palustrine-associated wildlife species.







## FLOOD PLAIN PROCESS GROUP



### DESCRIPTION

Flood Plain and Glacial Outwash channels are associated with the valley bottom flood plain landform. These two process groups contain low gradient sinuous singular or anabranching channels. Braided channels are more prevalent in the Glacial Outwash. Mountain slope runoff and ground water discharge control stream flow in the FP group while glacial melt controls flow in the glacial outwash process group. Peak flows may occur in the spring and fall in the floodplain process group while in the summer for the glacial outwash group. Sediment deposition is the dominant process in both groups. Substrate material ranges from sand to cobble size material in both groups. Floodplains support standing old growth spruce with heights up to 130 feet. Downed wood provides nurse logs for regeneration, sediment retention, and infiltration. Floodplain width may exceed 200 feet on FP4 and FP5 channels, but are generally less than 200 feet on FP3 channels. These areas are typically highly productive for fish. Large wood and off channel rearing areas are of particular significance as habitat features. Early successional forest species, such as black cottonwood, are common in the glacial outwash process group.



### STREAM CLASS / ACTIVITY

#### I, II (direct)/Timber Harvest

No commercial timber harvest within 100 feet of class I streams and class II streams that flow directly into class I streams. Although not required by the Tongass Timber Reform Act, no commercial timber harvest in the floodplain until the completion of watershed analysis. No programmed commercial timber harvest in the Riparian Management Area (greatest of floodplain, riparian vegetation or soils, riparian associated wetland fens, or 130 feet (the height of one site-potential tree)). Manage an appropriate distance beyond the no-harvest zone to provide for a reasonable assurance of windfirmness of the Riparian Management Area (pay special attention to the area within one site-potential tree height of the Riparian Management Area).

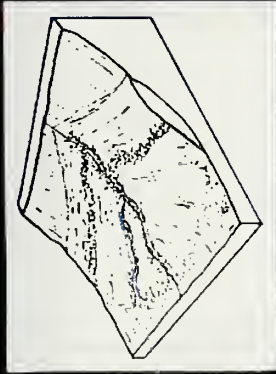
#### II (non-direct), III/Timber Harvest

No programmed commercial timber harvest in the Riparian Management Area (greatest of floodplain, riparian vegetation or soils, riparian associated wetland fens, or 130 feet (the height of one site-potential tree)). Manage an appropriate distance beyond the no harvest zone to provide for a reasonable assurance of windfirmness of the Riparian Management Area (pay special attention to the area



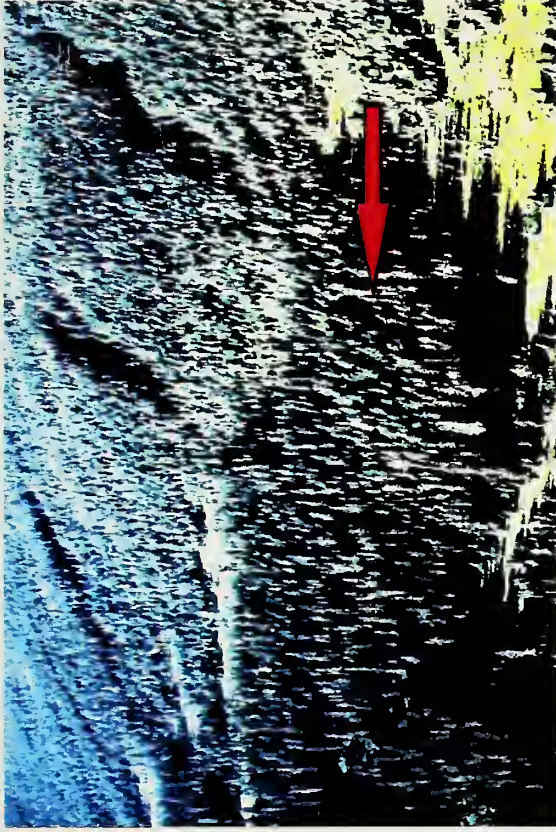


## ALLUVIAL FAN PROCESS GROUP



### DESCRIPTION

Alluvial fan channels flow directly over the alluvial fan landform. These are dynamic multi-branched channels that periodically change course within the landform. Stream gradient ranges from 1 to 3 percent on the lower half of the alluvial fan and increases toward the fan apex. The alluvial fan channel is associated with high gradient contained channels; therefore streamflow is dependent on mountain slope runoff. Groundwater discharge is also significant. Surface flow may be intermittent as substrate consists of sand to cobble size material. During low flow periods stream flow may run subsurface in the middle section of the alluvial fan and emerge on the lower section. Aggradation of material is the dominant process on the alluvial fan and fine sediment may be deposited in the low gradient section. The active channels on alluvial fans often include multiple high flow channels and unvegetated gravel or cobble outwash lobes with ill-defined channel banks. Alluvial fans typically support large spruce with diameters (DBH) of 30" and have average site-potential tree heights of 140 feet. Downed wood serves as nurse logs for regeneration.



### STREAM CLASS / ACTIVITY

#### I, II (direct)/Timber Harvest

No commercial timber harvest within 100 feet of class I streams and class II streams that flow directly into class I streams. No programmed commercial timber harvest within the Riparian Management Area, which is the greater of the active portion of the alluvial fan or 140 feet (the height of one site-potential tree) from the current channel(s). Manage across the remainder of the fan (no more than 10% of the fan harvested in a 30 year period) with the objective of leaving large trees within the stand for future recruitment to stream channels.

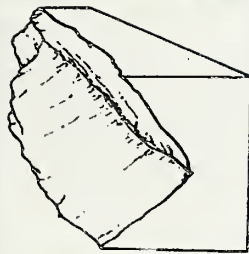
#### II (non-direct), III/Timber Harvest

No programmed commercial timber harvest within the Riparian Management Area, which is the greater of the active portion of the alluvial fan or 140 feet (the height of one site-potential tree) from the current channel(s). Manage across the remainder of the fan (no more than 10% of the fan harvested in a 30 year period) with the objective of leaving large trees within the stand for future recruitment to stream channels.





## MOD GRADIENT/ MIXED CONTROL



### DESCRIPTION

These channels are commonly found in transition zones between high gradient contained streams and floodplain channels. They are located in narrow valleys, footslopes or sloping and rolling lowlands. Stream channel gradients range from 2 to 6 percent. Channel containment is variable as structural control may be intermittent or only along one bank. Overall channel pattern is straight. Stream flow is dependent upon mountain slope runoff and the sediment regime is balanced (input equals output). Channel substrate ranges from coarse gravel to boulder size material. Typical site potential tree height is 120 feet.

### STREAM CLASS / ACTIVITY

#### I, II (direct)/Timber Harvest

No commercial timber harvest within 100 feet of class I streams and class II streams that flow directly into class I streams. No programmed commercial timber harvest in the Riparian Management Area(greatest of floodplain, riparian vegetation or soils, riparian associated wetland fens, or 120 feet(the height of one site-potential tree)). Manage an appropriate distance beyond the no-harvest zone to provide for a reasonable assurance of windfirmness of the Riparian Management Area(pay special attention to the area within one site-potential tree height of the Riparian Management Area).

#### II (non-direct),III/Timber Harvest

No programmed commercial timber harvest in the Riparian Management Area(greatest of floodplain, riparian vegetation or soils, riparian associated wetland fens, or 120 feet(the height of one site-potential tree)). Manage an appropriate distance beyond the no harvest zone to provide for a reasonable assurance of windfirmness of the Riparian Management Area(pay special attention to the area within one site-potential tree height of the Riparian Management Area).







## MOD GRADIENT/ CONTAINED

PG



### DESCRIPTION

Moderate Gradient Contained channels are associated with sloping or rolling low-lands. Stream gradient ranges from 2 to 6 percent for these singular, straight and entrenched channels. Stream flow is dependent upon mountain slope runoff. Sediment is transported through these channels. Substrate is dominated by cobble, boulder and bedrock material. Habitat is often limited by stable large wood structures. Riparian vegetation communities are varied. Riparian width, including floodplain and sideslope breaks, reach 60 to 70 feet. A site potential tree height is 100 feet.

### STREAM CLASS / ACTIVITY

#### I and II's (direct)/Timber Harvest

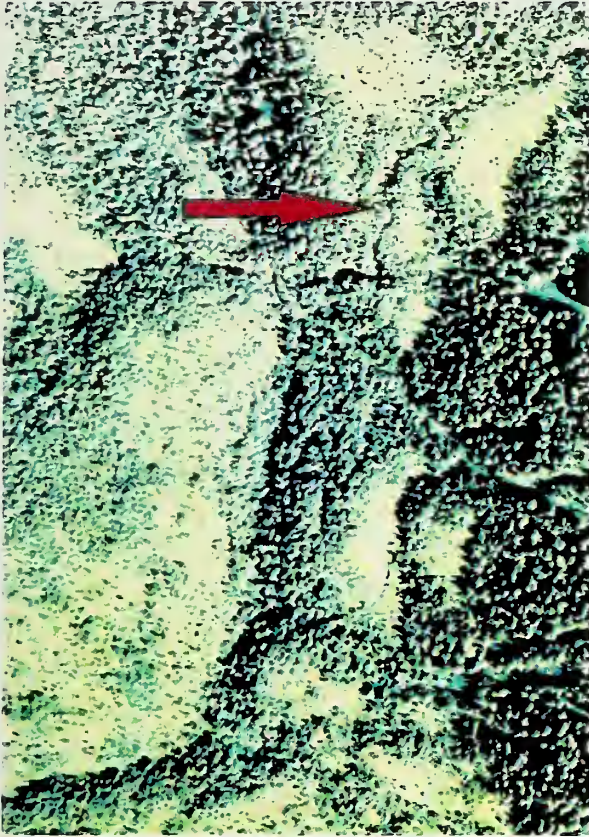
No commercial timber harvest within 100 feet of class I streams and class II streams that flow directly into class I streams. No programmed commercial timber harvest within the remainder of the Riparian Management Area, defined as within the channel sideslope break. Manage an appropriate distance beyond the no-harvest zone to provide for a reasonable assurance of windfirmness of the Riparian Management Area (pay special attention to the area within one site-potential tree height of the Riparian Management Area).

#### II's (non-direct)/Timber Harvest

No programmed commercial timber harvest within 100' or within the channel sideslope break, whichever is greater. Manage an appropriate distance beyond the no-harvest zone to provide for a reasonable assurance of windfirmness of the Riparian Management Area (pay special attention to the area within one site-potential tree height of the Riparian Management Area).

#### III/Timber Harvest

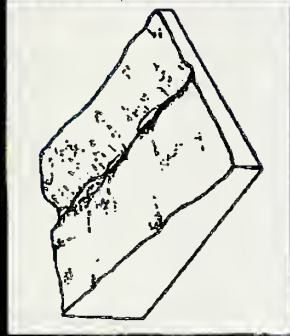
No programmed commercial timber harvest within the Riparian Management Area, defined as the side-slope break. Manage an appropriate distance beyond the no-harvest zone to provide for a reasonable assurance of windfirmness of the Riparian Management Area (pay special attention to the area within one site-potential tree height of the Riparian Management Area).





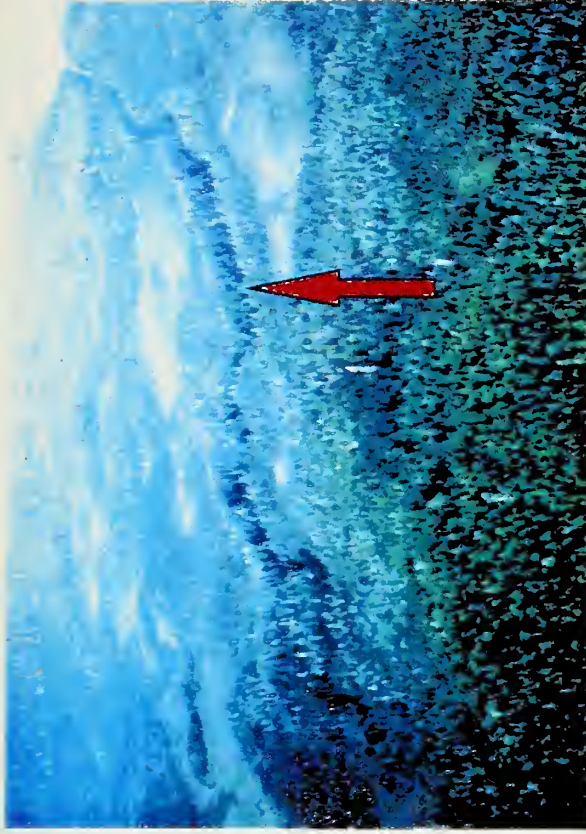


## LARGE CONTAINED PROCESS GROUP



### DESCRIPTION

Large Contained channels are associated with canyons or sloping lowlands. These are low gradient (less than 3 percent), singular, straight and entrenched channels with gravel to bedrock substrate. Sediment regime balances input with output. Stream flow is dependent upon mountain slope or lowland runoff. Habitat is often limited by a scarcity of stable large wood structures. Riparian vegetation communities are varied. Riparian width, including flood plain and sideslope breaks reach 150 feet (LC1) to 190 feet (LC2). A site potential tree reaches an average height of 100 feet.



### STREAM CLASS / ACTIVITY

#### I and II's (direct)/Timber Harvest

No commercial timber harvest within 100 feet of class I streams and class II streams that flow directly into class I streams. No programmed commercial timber harvest within the Riparian Management Area, defined as within the channel sideslope break. Manage an appropriate distance beyond the no-harvest zone to provide for a reasonable assurance of windfirmness of the Riparian Management Area (pay special attention to the area within one site-potential tree height of the Riparian Management Area).

#### II's (non-direct)/Timber Harvest

No programmed commercial timber harvest within the Riparian Management Area, defined as within 100 feet of the stream or the top of the side-slope break, whichever is greater. Manage an appropriate distance beyond the no-harvest zone to provide for a reasonable assurance of windfirmness of the Riparian Management Area (pay special attention to the area within one site-potential tree height of the Riparian Management Area).

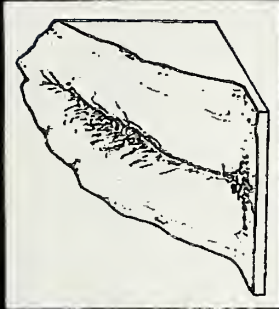
#### III/Timber Harvest

No programmed commercial timber harvest within the Riparian Management Area, defined as the side-slope break. Manage an appropriate distance beyond the no-harvest zone to provide for a reasonable assurance of windfirmness of the Riparian Management Area (pay special attention to the area within one site-potential tree



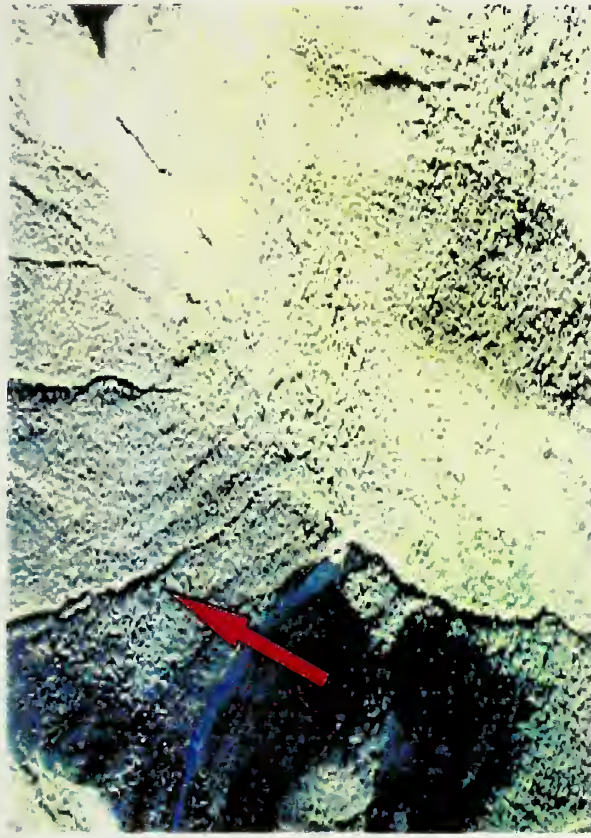


## HIGH GRADIENT/ CONTAINED PG



### DESCRIPTION

High Gradient Contained channels are located on mountain slopes. These are singular straight incised channels with steep slopes and channel gradients greater than 6 percent. Stream flow is dependent upon mountain slope runoff and may be intermittent. Sediment is readily transported through these channels. Substrate material ranges from cobble to bedrock. Riparian Management Areas include incised channel sideslopes. Hemlock series dominates vegetation although spruce is also common. Some streams have intermittent flows. Steep gradients (>6%) limit fish capability. Typical site-potential tree height is 120 feet.



### STREAM CLASS / ACTIVITY

#### I, II (direct)/Timber Harvest

No commercial timber harvest within 100 feet of class I streams and class II streams that flow directly into class I streams. No programmed commercial timber harvest within the Riparian Management Area, defined as within 100 feet of the stream or to the top of the V-notch (side-slope break), whichever is greater. Manage an appropriate distance beyond the no-harvest zone to provide for a reasonable assurance of windfirmness of the Riparian Management Area (pay special attention to the area within one site-potential tree height of the Riparian Management Area).

#### II (non-direct)/Timber Harvest

No programmed commercial timber harvest within the Riparian Management Area, defined as within 100 feet of the stream or the top of the V-notch (side-slope break), whichever is greater. Manage an appropriate distance beyond the no-harvest zone to provide for a reasonable assurance of windfirmness of the Riparian Management Area (pay special attention to the area within one site-potential tree height of the Riparian Management Area).

#### III/Timber Harvest

No programmed commercial timber harvest within the Riparian Management Area, defined as the V-notch (side-slope break). Following watershed analysis, Riparian Management Areas which become available for timber harvest will be converted from non-suitable to suitable forested lands. (On a forest-wide basis, it is anticipated that this change will occur along up to 25% of the class III streams in this process group. Manage an appropriate distance beyond the no-harvest zone to provide for a reasonable assurance of windfirmness of the Riparian Management Area (pay special attention to the area within one site-potential tree height of the Riparian Management Area).

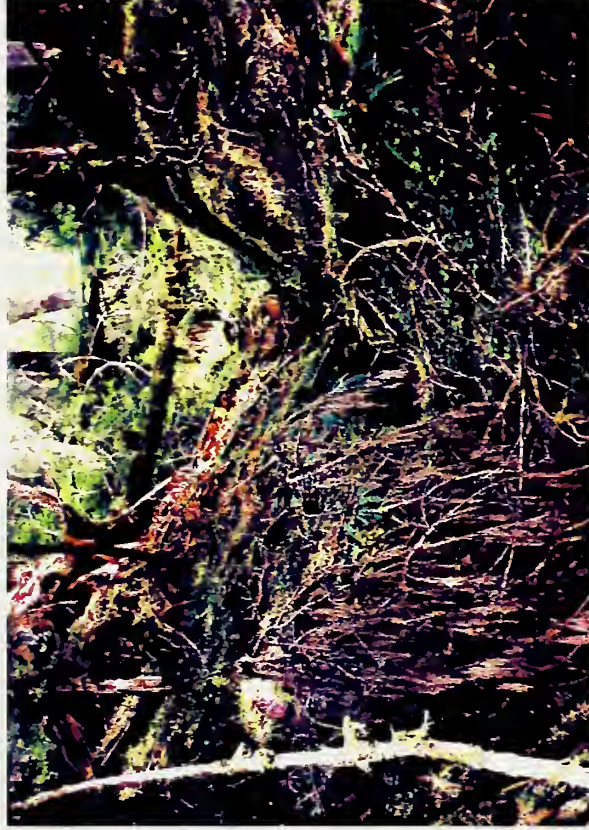
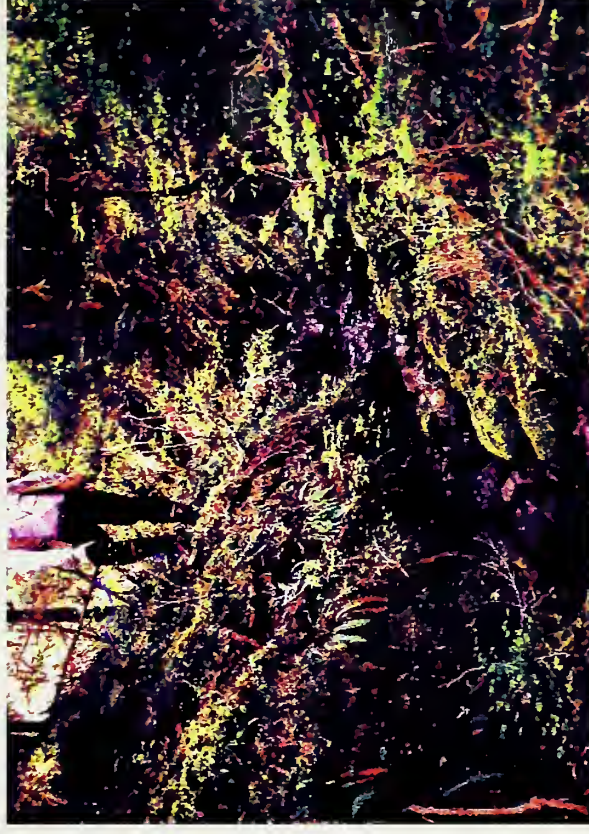




## EXAMPLES OF CLASS 4 STREAMS

Class IV streams are defined as other intermittent, ephemeral, and small perennial channels with insufficient flow or sediment transport capabilities to have an immediate influence on downstream water quality or fish habitat capability. These streams generally are shallowly incised into the surrounding hillslope. Stream Class IV will be treated as part of the hillside under slope stability standards and guidelines (see Soil and Water Forest-wide Standards and Guidelines). Apply Best Management Practices.

Class IV streams have bankfull widths between 1-5 feet and incision is less than 15 feet. Due to their short length and difficulty in accurately mapping them, some Class IV streams do not appear on unit cards but will be located and flagged during unit layout and will appear on sale area maps along with the appropriate protection measures.







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